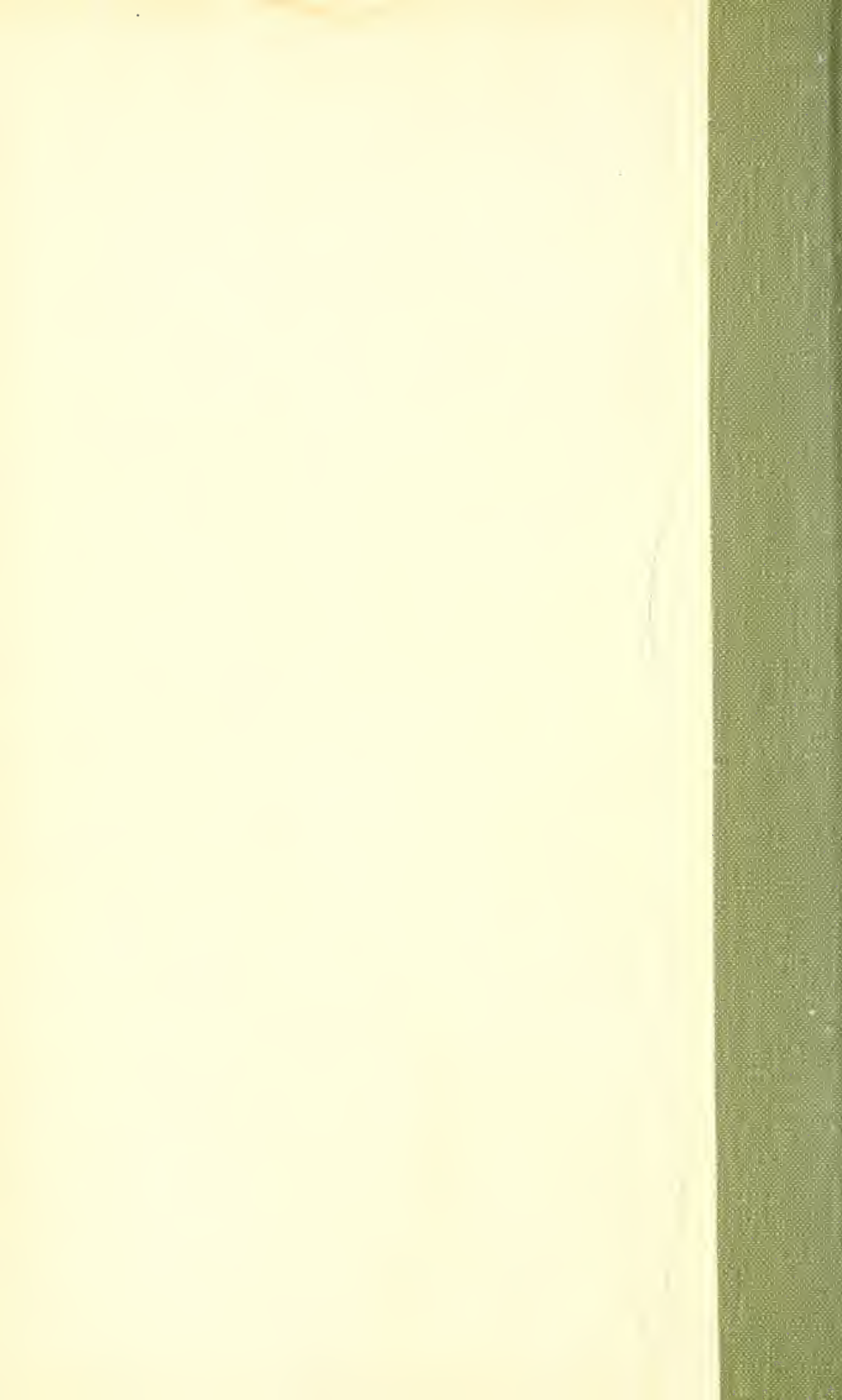


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FOUNDED BY JAMES PLEASANT PARKER.

VOL. XII. 1903.

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ANNALS
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VOL. XII.

MARCH.

No. 1.

I.

PERITONSILLAR ABSCESSSES.*

BY FREDERICK C. COBB, M. D.,

BOSTON, MASS.

The title of this paper should perhaps be the location of pus in the peritonsillar abscess, since it is to that portion of the subject that particular attention is directed.

If we look over the text-books we find but little attention directed to the anatomy of the peritonsillar tissue, and are usually simply told that pus forms in the tissues surrounding the tonsils. What the origin of the pus is, we are not told definitely; some authors holding that it originates in the peritonsillar tissue in the same way as an abscess in other parts of the body, while some assert that it is due to the entrance of streptococci from the tonsils. The antecedent acute tonsillitis is denied by some and affirmed by others, but the trend of modern opinion is in favor of this belief. That acute tonsillitis is often the precursor of quinsy, the author as well as many others has often observed. That peritonsillar abscess

*Read at the meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society, in New York, 1902.

may show no signs of lacunar inflammation is also a common observation; but it is reasonable to believe that if the chain of evidence has been observed in which peritonsillar abscess follows acute tonsillitis, such a source of infection is the usual one and that infection, if not obvious, must have occurred, even if all traces have disappeared at the time of the exam-



Fig. 1.

Injection through the Tonsil into the Pharyngo-Maxillary Space
Showing its Relation to the Anatomy of Peritonsillar Abscess.

ination. Goodale's researches on the absorption by the tonsil of carmine and other extraneous substances render it probable that germs enter with as great or greater facility into the peritonsillar tissue.

If we study the anatomy of the peritonsillar tissue with reference to its limits as a pus-containing cavity, we find that

the tonsil is situated in a groove formed by the posterior pillar behind, the anterior in front, and externally the fascia of the superior constrictor of the pharynx, to which the tonsil is often closely adherent. Externally is a space alluded to by the anatomists as the pharyngo-maxillary fossa. This space will be described later, but at present it is sufficient to



Fig. 2.

say that the inner wall is composed of pharyngeal aponeurosis already alluded to, on which the tonsil rests. The mucous membrane is reflected from anterior pillar to tonsil and from tonsil to posterior pillar, forming by its passage in either direction a groove, shallow or deep, between the pillars and the tonsils.

Especially above the tonsil is the reflection of the mucous

membrane interesting, since it descends deep into the neck between the pillars and above the tonsil a far greater distance than would be supposed. Under this mucous membrane, between it and the pillars, is a variable amount of loose connective tissue, and in places lymphatic or adenoid remains.

There are then three places in which pus formed during peritonsillar abscesses may be enclosed: 1st, the pharyngo-maxillary fossa; 2nd, the supra-tonsillar fossa; 3rd, the loose

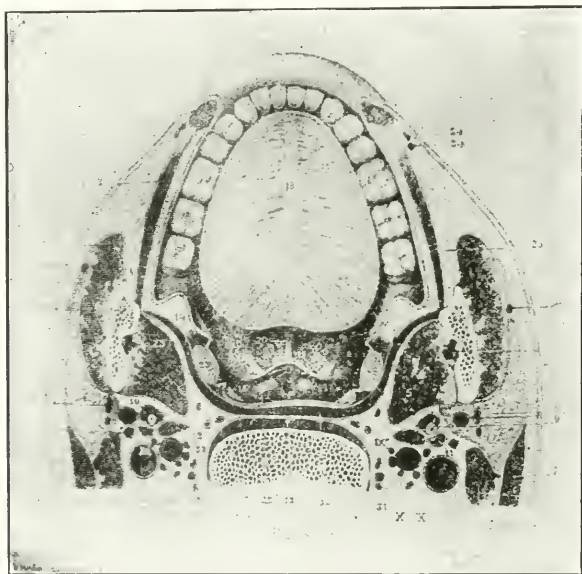


Fig. 3.

connective tissue underneath the mucous membrane surrounding tonsil or fossa. These three possible locations will be described in detail.

First, the pharyngo-maxillary fossa, suggested by Chiari of Vienna as the possible seat of suppuration, is a cavity filled with loose connective tissue, bounded externally by the pterygoid muscle, internally by the aponeurosis of the superior constrictor of the pharynx, which carries, on its inner or

throat side, the tonsil. This cavity is divided into two portions by the stylo-pharyngeus and stylo-glossus muscles and their aponeuroses. The posterior portion contains the large vessels of the neck, while the anterior contains only fat and connective tissues, and is in relation with the tonsil through interposition of the pharyngeal constrictor. It is evident that if pus filled the anterior portion of this cavity it would push the tonsil forward and inward and give us one of the symp-



Fig. 4.

toms of peritonsillar abscess. Chiari claims that the division between the anterior and posterior portions of the cavity is sufficiently strong to prevent the pus, in ordinary cases, from entering the posterior portion and so passing down along the sheath of the great vessels into the chest. The usual termination of the peritonsillar abscess is of course discharge into the throat; but there are several cases on record where pus has found its way into the chest, causing empyema and death.

Reference to the photograph made for me by Dr. Mosier

of plates taken from Testut's book will show the anatomical situation of the pharyngo-maxillary fossa in the normal state. In order to ascertain the form of the fossa when dilated, Dr. Mosier and I injected the cadaver with warm wax, entering the needle at a point below the angle of the jaw, so as to bring the point within the pharyngo-maxillary space. After filling the cavity with wax as thoroughly as possible, we examined the throat and found an appearance closely



Fig. 5.

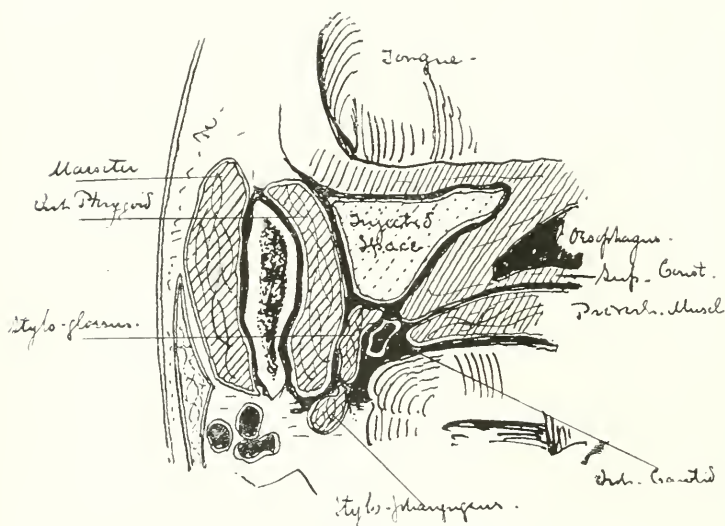
resembling that of a clinical peritonsillar abscess, the uvula, tonsil and peritonsillar tissue being pushed inward as in quinsy. Horizontal sections were then made of the head just below the level of the hard palate, and photographs of the lower section taken. These photographs show the pharyngo-maxillary fossa dilated; in one case empty of the wax, in the other with the previously empty space filled with absorbent cotton, in order to produce sharper definition. It was found that the wax did not easily penetrate beyond the

stylo-glossus and stylo-pharyngeus muscle. It will be noted that, in order to reach the throat, pus must pass through the superior pharyngeal constrictor, which, even in the cadaver, is a strong muscle, and when dilated with blood in the living subject and swollen by the products of inflammation in the sufferer from peritonsillar abscess, would be a powerful barrier.

The supratonsillar fossa of His is next to be considered as a possible location. This fossa cannot be better described than in the anatomist's own words: He says—"In the fetus of four or five months, the free edge of the anterior pillar forms a three-cornered fold, the apex of which is lost in the velum, while the base by a broad attachment is inserted into the tongue. The posterior border of this plica triangularis covers a cavity which corresponds to the earlier groove between the second and third branchial prominences. Subsequently, the surface of the cavity swells and through the addition of adenoid tissue becomes the tonsil—a process which has already begun before birth.

In most cases the mucous membrane undergoes so general a process of folding and swelling that signs of the earlier cavity are hardly traceable in the tonsillar crypts. One can sometimes recognize the location of the plica only as a smooth surface covering the anterior face of the tonsil. In other cases, and they are not infrequent, we find the original condition of the locality little changed; that is a well-marked plica triangularis and as evident a fossa above the tonsil." I need not quote the author further, except to say that he has found the fossa running upward and outward above the tonsil as deep as one and one-half centimeters, and that the posterior boundary of the cavity is always the palato-pharyngeus and that this muscle separates it from the fossa of Rosenmueller. It is, of course, conceivable and possible that the supratonsillar fossa should be walled off by adhesions, and that one or more crypts discharge into it from the tonsil and start suppuration, which would give peritonsillar abscess. Should the tonsil fully fill the mouth of the fossa and become adherent to it, the same result might occur. The author has dissected the supratonsillar fossa and found in the few cases examined some instances of adhesions covering the mouth of

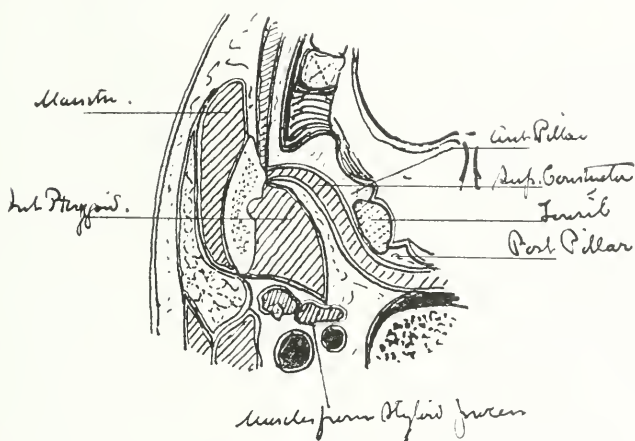
the fossa. Unfortunately, the fossa being larger at its mouth than at its upper and outer end, does not lend itself well to injection, so the distended appearance could not be compared with that of the pharyngo-maxillary fossa. The supratonsillar fossa has been found by some authors to contain detritus, and on the washing this out pus has been liberated and sore throat relieved. It is evident, therefore, that the supratonsillar fossa may be another possible location for pus in peritonsillar abscess, and its claims will be considered before the third possible location, the areolar



tissue about the tonsil, has been described. This areolar tissue is found at the base of the tonsil and beneath the mucous membrane, which is reflected from the pillars upon it. When we pull the tonsil inward with a tenaculum, we find it in most cases freely movable, and that it can be drawn for some distance from its bed, moving toward the centre of the throat, as a telescope is pulled out after being closed. This movement shows the body of the tonsil to be lying quite deeply between the pillars, its outer edge indicated beneath the palate as we move the inner edge about. The microscope shows the loose texture of the areolar tissue as well as

does the clinical effect just stated. It is, of course, plain that the filling of this tissue would force the tonsil inward and forward, as in peritonsillar abscess.

If we now attempt to diagnose clinically from the appearance, symptoms and results of puncture between the three pathologic conditions, we find that the assumption of the pharyngo-maxillary fossa as a location for pus is open to the following objections: First, the pus will probably empty more frequently into the chest than it does, having for that route less obstruction, viz.: the stylo-glossus and stylo-pharyngeus muscles to pass; while to make its exit into the



throat it has to pass through the aponeurosis of the superior constrictor and that muscle itself, which are more solid and strong than the styloid muscles mentioned. Second, that in puncturing any peritonsillar abscess between the anterior pillar and tonsil we often find a thin partition between us and the suppuration. It will be remembered that if the seat of pus were in the pharyngo-maxillary fossa we must pass through the superior constrictor to reach it. It would therefore require a deep puncture through thick muscle to reach the pus, which is often not the case. Third, if we consult the photograph of the distended pharyngo-maxillary fossa, we see that the cavity has its apex inward, while its broad base looks outward toward the ramus of the jaw. If we

remove a tonsil during peritonsillar abscess, we find ourselves looking into a fossa which is almost cone-shaped, with the base toward the uvula and the apex directed toward the jaw. These four points are sufficient in my opinion to determine us against the pharyngo-maxillary fossa as a location for the abscess.

We now come to the supratonsillar fossa. Here the diagnosis is more difficult. It seems to me evident that, first, if pus filled the supratonsillar fossa it would push the tonsil downward, since the fossa is above the tonsil, and outward, as soon as the palate begins to overlap the tonsil. In peritonsillar abscess we find the tonsil pushed inward toward the center of the throat, and usually not pushed downward. Second, in my experience pus is most frequently found anterior to the tonsil along its upper third. Third, unless hindered by adhesions we should be able to enter the fossa with a probe without cutting the mucous membrane, and so liberate the pus, which is not true. Fourth, if the pus in peritonsillar abscess is located in the supratonsillar fossa, we should never be able to enter that fossa without liberating pus. But in several cases I have been able to enter it during peritonsillar abscess without getting pus. Fifth, in the cases mentioned, in which the tonsil has been removed or partially removed during peritonsillar abscess, we find pus below the lower half of the tonsil; while if in the supratonsillar fossa it would be located above the tonsil.

We have remaining the areolar tissue about the tonsil, which can be examined through the microscope adhering to the tonsil after its removal. The great motility of the tonsil when not inflamed shows its loose and elastic tissue. If it is true that pus occupies in ordinary peritonsillar cases neither the pharyngo-maxillary nor the supratonsillar fossa, then it must be confined to the areolar tissue about the tonsil. Clinically, too, there is justification in Moure's classification of the antero-superior, postero-superior and external peritonsillar abscess, a classification based upon the clinical appearance of the abscess and on the fact that pus appears and is obtained anterior, posterior and external to the tonsil. Fourth, if the appearance of peritonsillar abscess were always the same, it would be an argument for pharyngo-maxillary or supratonsillar fossa, which are defined cavities, whereas if pus is anterior to the tonsil in one case, posterior to it in another and external to it in a third, it seems more likely that pus is confined in different cavities, holding different relations to the tonsil. Clinically, in most cases we find pus between anterior pillar and tonsil, more rarely between posterior pillar and tonsil, and seldom external to the tonsil itself.

In puncture of peritonsillar abscess the location of pus becomes important. We should not forget that the tonsil lies as a rule quite deep between the pillars, so that if we puncture in the location advised by most authors, that is in a line between the uvula and the wisdom tooth, we run the risk of puncturing the tonsil instead of the abscess. This is probably the reason why so many punctures of peritonsillar abscesses are failures. On the other hand, if we incise between anterior pillar and tonsil in the antero-superior variety, or between posterior pillar and tonsil in the posterior variety, we pass along the axis of the tonsil and reach pus as soon as we have crossed its outer border. We are warned in the text-books of the danger of injuring the great vessels by this procedure. I believe these fears are unwarranted and that the measurements made on the cadaver do not take into account the pathologic conditions existing at the time of puncture. In antero-superior cases I have taken pains to measure the distance from the palate to the posterior wall of the cavity, which is the posterior pillar of the fauces. This depth has been found to be one and one-fourth to one and one-half inches; so that a puncture of an inch in length in an outward direction is quite safe. As will be seen by the photograph taken from Testut's book, the vessels lie in a plane posterior to one passed through both posterior pillars. In cases of postero-superior abscess a right-angled knife should be used and carried above and behind the tonsil; in external, the incision can be made as in anterior, but with more care as to depth of incision. These latter cases, if allowed a day or two to mature, will become anterior or posterior, in my opinion.

I have not dwelt on symptoms, prognosis or treatment, except incision, since these are fully treated in text-books. One word as to prevention of recurrence. If the tonsil is removed by dissection during peritonsillar abscess so as to throw open the abscess cavity, recurrence can be avoided in the great majority of cases. I have records of patients so operated upon in which no recurrence had taken place in periods varying from one to five years.

To summarize: Three locations have been claimed as possible situations of peritonsillar abscess. First, the pharyngo-maxillary fossa; second, the supratonsillar fossa; and third, the areolar tissue about the tonsil. From the anatomic conditions and the clinical appearances, the site of the abscess is believed to be the areolar tissue. The incisions used are an upward and backward one, using a straight knife, for antero-superior cases; while for postero-superior an outward incision between posterior pillar and tonsil, with a right-angled knife, is advised.

II.

REPORT OF A CASE OF LARGE CEREBRAL ABSCESS OCCURRING DURING THE COURSE OF AN ACUTE SUPPURATION OF THE MIDDLE EAR. OPERATION. RECOVERY.

BY J. F. BARNHILL, M. D.,

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AND LARYNGOLOGY, CITY, DEACONESS AND UNION
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DISPENSARY.

Mrs. R. A., age 40, of Indianapolis, consulted me at my office, July 26, 1902, complaining of severe earache in the right ear. The membrana tympani was intensely engorged and red though not bulging. I applied a hot tampon of carbolyzed glycerine to the bottom of the external meatus and against the drum membrane, gave a saline purge, prescribed an anodyne for internal use if necessary, and gave instructions to use the hot water bottle constantly on reaching home. She reported next day at my office that she had suffered greatly since the last visit. Inspection of the fundus of the ear showed the drum head much inflamed and bulging, and I therefore made an extensive paracentesis. There was a distinct snapping sound when the knife perforated the membrane, an escape of gases, and an unusually large amount of serum drainage. The meatus was packed loosely with bichloride gauze, and the patient kept in my office for an hour with an electric heater over the ear. During this time sufficient serum poured out to saturate the gauze and trickle down the patient's neck. I predicted that she would have a comfortable night, but the suffering continued but little if any less than before the paracentesis.

I was away from the city the three days following, during

which time Dr. B. A. Brown, the family physician, was called and made every effort to relieve the suffering, but without success. I next saw the patient about Aug. 10, finding her in bed and exhibiting every evidence of having undergone very great suffering. The pain was not so much around or in the depths of the ear as it was over the temple at the outer angle of the supra-orbital ridge, and was in many ways much like a facial neuralgia, of which the patient had often severely suffered. The ear was discharging freely and the perforation I had made was giving sufficient drainage. There was no tenderness over the mastoid, no fever and no circulatory disturbance. Dr. Brown and I were both of the opinion that there must be a neuralgic element in the case, and we therefore treated it as such for several days without the slightest benefit. Aug. 18 the patient had been sleepless for some days on account of pain, and there was a very little tenderness over the mastoid, but no discoloration or swelling. The very profuse aural discharge, the character and continuance of the pain and the history of the case led me to think that there might be mastoid involvement. I had seen and operated upon some cases of mastoiditis in which the pain and other symptoms were obscure, although not approaching the obscurity of the case in hand, but in which operation had proven a collection of pus to be present. After a thorough examination of every feature of the situation we decided that an exploration of the mastoid antrum and cells was indicated, and accordingly the next morning this was done, Drs. B. A. Brown and Frank Berry assisting. The mastoid cells were filled with pus and the whole were ablated. The mastoid antrum was entered and its walls inspected, but was nowhere found to be necrotic, and contained no pus. I had at the time no doubt but that this operation would end in speedy recovery, but was a second time disappointed, for the patient continued to suffer just as before.

On the third day following the mastoid operation, Dr. Brown reported that in lifting a tablet to her mouth, Mrs. A. was observed to be halting and uncertain in the movements of her left arm and hand. This remained about the same for a day, but on August 22, there was complete paralysis of the left hand and arm, and paresis of the leg on the same side.

The pupil of the right eye was very greatly enlarged, the pulse was 60, the temperature normal, there was frequent bilious vomiting, and patient so insensible as to recognize nothing about her. Dr. Brown and I perfectly agreed that there was brain abscess, and asked to have Dr. Wm. Chas. White called to locate the situation in the brain, so that operation might be the more wisely performed. Dr. White gave it as his opinion that the abscess was located in the temporal lobe, two or more inches above the external meatus.*

The family consenting to a second operation, this was undertaken August 23, Drs. Brown, White and Little assisting. The patient was at this time in such a comatose state that the whole of one side of the head was scrubbed and shaved without her knowledge. The former mastoid wound was opened, disinfected, and then the tegmen antri was chiseled away over a large enough area to expose a square inch of dura-mater, which showed little or no disease. The wound was then extended into the temporal region, and a button of bone removed from the squama, one and one-half inches above the tegmen antri. The dura was ash colored and bulged through the opening at once. When incised its inner surface was found covered with thick pus, but not in sufficient quantity to flow out. A bistoury was used to explore the brain, and the first incision directed inwardly, struck the abscess, which was under sufficient pressure to squirt its contents a foot into the air. Thus escaping it was impossible to measure the quantity, but I believe a very low estimate was four ounces, and the cavity left in the cranium after it was all evacuated seemed to include a considerable part of the contents of the skull. The lowest part of the cavity was connected with the opening through the tegmen antri, a rubber drainage tube was inserted into the upper opening and brought out through the lower, and the whole then gently flushed with normal salt solution. A strip of iodoform gauze was also carried by the side of the tube, but this was removed on the second day.

The improvement was immediate, and recovery took place without a single unpleasant symptom. Intelligence and the

*Prof. White's notes and opinions of the case are appended.

use of the paralyzed parts returned as soon as the effects of the anesthetic wore off. The neuralgic pain disappeared at once, appetite returned, and the patient was joking with her attendants within three days. The pulse rose to normal, and at no time was the temperature above $99\frac{1}{2}$ F.

The drainage tube was allowed to remain four days, and during this time the cavity was gently washed with normal saline solution. The upper opening was then allowed to close, but a strip of gauze was kept in the lower for a week longer.

Intra-dural abscess is far more frequently met with during a chronic than during an acute middle ear suppuration. In this case the infection had undoubtedly been carried to the brain through the vascular channels, since there was no indication anywhere of the tegmen antri or tympani having become necrotic.

The patient* now (March 1, 1903) feels better than for several years, is entirely free from pain, hears almost normally in the affected ear, there is no discharge, and she is much heavier than before her illness.

Dr. White's report of the case is as follows:

I saw the patient first with Dr. Barnhill on the evening before the operation, and she was then in the following condition. In these notes only those features referring directly to the location of the abscess will be given, since diagnosis of abscess of the brain had already been made.

The patient was lying upon her back oblivious to her surroundings. On careful examination the left side of the face was found to be flatter and the lines were less distinct than on the right side. The left corner of the mouth, and left outer canthus of the eye drooped a little more than the right one; and the left cheek moved more in respiration than the right; and the left side of the body was more or less paralyzed, falling to the bed heavily when raised, and yet resisting somewhat passive movements, especially the arm. The left pupil still reacted to light. The right one was widely dilated and inactive, and there was a well marked lateral nystagmus. Upon repeatedly requesting the patient to move her left arm, or protrude her tongue she would still make some attempt to do so. The tongue had a tendency to protrude toward the left side. The repeating of the request might be looked upon in the light of increasing the stimulus until the requisite degree was reached to arouse the cerebral cells to action. The leg was more disabled than the arm, and sensation was quite in abeyance over the whole left side.

*The patient was exhibited at a meeting of the Indianapolis Medical Society, December, 1902.

The knee jerk and triceps jerk on the left side were markedly exaggerated, and there were also present an ankle clonus and distinct Babinsky reflex (i. e. an extensor reflex of the great toe on plantar irritation) on the same side.

The reflexes and sensation on the right side were not affected, and the right limbs were moved on request and resisted passive movement.

From (a) the completeness of the hemiplegia; (b) the retained and increased spinal reflexes; (c) the newly acquired reflexes, i. e., the clonus and extensor reflex of the great toe, we had to do with a lesion affecting the upper group of neurones, those leading from the cortex on the side opposite the paralysis to the nuclei of the peripheral nerves on the same side as the paralysis in the medulla and spine, and further in such position as to control the whole group, and also the group conducting the sensation from the left side cerebral-wards, i. e., those of the internal capsule; still from the partial retention of cerebral control over the lower motor or peripheral group of neurones as evidenced by the patients response to repeated commands, the lesion was not one destroying the continuity of the upper cerebral group. Again, the paralyzed side being made quiet, the lesion was evidently not a cortical lesion alone at least, and it was in its progressive period, the paralysis increasing in degree as the hours passed.

The lesion was then cerebral, subcortical and not invading the Rolandic area in such a way as to produce a rhexis of the axis cylinders of the upper neurone group, but nevertheless increasing in its power over their function. It must in other words hold them in abeyance by pressure upon them.

From (a) the loss of the patient's interest in her surroundings a function ascribed to the posterior silent area of the hemisphere, (b) the differing degree of intensity with which the neurone groups were affected, namely: in order of intensity, sensation, lower extremity and face, (c) the old mastoid trouble which, however, had not broken through, this pressure must come from behind.

That is, the abscess must be in the right parietal lobe behind the post central convolution and behind the auditory word center in the posterior portion of the superior temporo-sphenoidal convolution, and yet high enough and forward enough to exert a considerable pressure on the axis cylinder processes from these regions, the only place for us to place it, then being beneath the angular gyrus, the supramarginal convolution and the posterior one-fifth of the superior temporo-sphenoidal convolution, or beneath a point on the skull one inch behind the external auditory meatus, and one inch above it on a line at right angles to Reid's base line.

III.

PACHYDERMIA AND CARCINOMA, WITH REMARKS ON THE DEVELOPMENT AND THE MICROSCOPIC DIAGNOSIS OF CARCINOMA.*

BY PROF. B. FRAENKEL, BERLIN.

TRANSLATED BY

THOMAS J. HARRIS, M. D., NEW YORK.

The basis for what I wish to communicate to you is found in the clinical histories of two patients. CASE I. On the 27th of March, 1897, Mr. K. accompanied by a colleague consulted me. The patient had been sent to me by Dr. O. Brieger of Breslau. Dr. O. Brieger had observed the patient for some time with me. Mr. K. showed in addition to extensive reddening and swelling of the vocal cords, a swelling of the size of a pea on his right processus vocalis which was attached somewhat subglottically. The growth had no pedicle, but otherwise gave accurately the appearance of a pachydermic swelling. I ordered the iodides and had the opportunity of seeing the patient several times during the next month. The swelling seemed to become smaller rather than to grow larger, and was pronounced by all who saw it to be pachydermia.

In June he went to Ems for the cure where he was treated by Dr. Aronsohn. When I again saw him, June 25, 1897, the growth showed a decidedly changed form. It did not reach as far superficially into the lumen but had decidedly increased in size posteriorly and downward. The growth now filled the subglottic region and the free edge and surface of the vocal cord from the posterior to the anterior third. Its surface was uneven. It could be seen that it had also advanced into the surrounding tissue. I removed at that time with the cutting forceps a section of the tumor. Microscopic ex-

*Archiv. für Laryngologie und Rhinologie, 1902.

amination gave atypical nests which pressed far into the connective tissue, in places without distinct boundaries, with irregular mitoses but without pearls, a condition accordingly which, if it was not altogether conclusive for carcinoma, was suspicious in a high degree. In accord with my other conferees it was now determined to remove the growth and the



Fig. 1.



Fig. 2.

attempt was first made to accomplish this endolaryngeally.

I succeeded on the 16th of August in accomplishing the entire removal in this manner. A local recurrence, however, soon took place. On September 20th I noted the following appearances. The free edge of the right vocal cord was attacked by a white, uneven tumor. Anteriorly but five

mm. of the cord remained free, but posteriorly the growth was not as pronounced as originally. The hyaline portion of the processus vocalis was free, but at the base of the processus a small, red nodule could be noticed, isolated from the rest of the tumor. Superiorly the tumor reached to the middle of the visible surface of the vocal cord, inferiorly the boundary could not be clearly seen. In any case it reached far into the subglottic region. Again the impression



Plate I.

was given that the growth had worked its way into the surrounding tissue. In several spots superficial ulceration could be detected. I removed for a second time a section for examination. This showed now undoubted carcinoma, i. e., isolated epithelial islets and numerous pearls. I accordingly recommended laryngofissure. This was performed on the 21st of September, 1897, by Dr. G. Hahn; introduction of the sponge cannula, splitting of the cricoid and thyroid cartilages, extirpation of the vocal cord, including the pro-

cessu; vocalis. After the operation the sponge cannula was exchanged for an ordinary one, the latter being removed the next day; no stitches and no sutures; healing through granulation. In May, 1898, I had the opportunity of again seeing the patient. A tumor was seen upon the cicatrices which ran anteriorly from right to left. This was the size of a large bean and filled on both sides

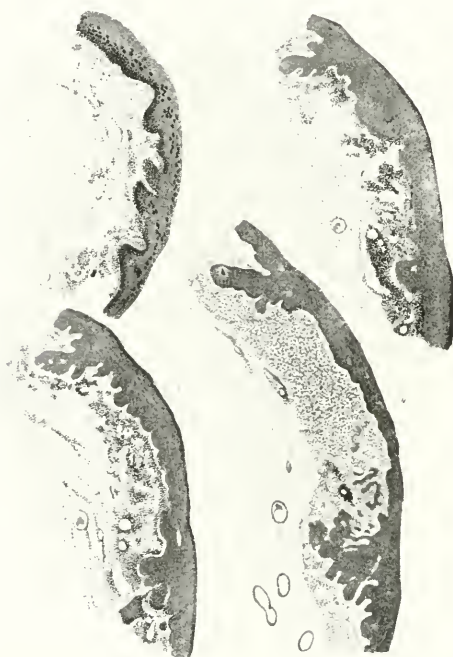


Plate II.

the anterior commissure, but was inserted on the right. It reached down into the subglottic space and prevented the left cord from approximating the mass which had taken the place of the extirpated right cord. As a result, marked hoarseness was again present. I was successful on the 13th day of May in removing the growth at one sitting. The microscopic examination showed that we had to do with a

simple granuloma, for the growth consisted entirely of loose connective tissue, without showing a single trace in its interior, of any epithelial nests. Since that time the patient has remained entirely well. At the site of his right vocal cord a swelling has formed which is similar to the vocal cord as it appears in the cadaver position. Where the tracheal cannula had been introduced, a spur is visible which reaches anteriorly. The voice is very good. I last had an oppor-



Plate III.

tunity of examining the patient on the 15th of March, 1902. Cicatricial growth, which had taken the place of the extirpated cord has now so far advanced that it presents the appearance of a true vocal cord and would be regarded as such by those who do not know the history. The vocal cord removed at the operation was cut microscopically by Dr. Alexander. Figures 1 and 2 show sections through the region in which the ulceration was especially marked. The

loss of substance is limited to the epithelium. The nests show in places typical pearls. From one of these, as for example the large one in figure 2, there might be some doubt whether it was a case of pachydermia or cancer, if in other places the appearance did not give the most positive signs of carcinoma.

Deeper in the connective tissue an isolated epithelial island could be seen which shows no connection in any of the re-



Plate IV.

maining sections with the nests. Connective tissue infiltration is recognizable in the region adjacent to the cancer in a marked degree.

CASE II. Dr. Croft, sanatorium director, sixty-four years old, consulted me on the 25th of July, 1900. He complained of hoarseness which had annoyed him since April and to which later had been added a sensation of suffocation. I found in addition to a rhinitis hyperplastica, both vocal cords greatly

reddened, opaque and thickened. On the right processus vocalis small nodules were seen and in the middle third of the right vocal cord a node of the size of a pea was attached sub-glottically, similar in color and appearance to the surrounding mucous membrane. This was attached by a broad base. I made the diagnosis of pachydermia diffusa with node formation and ordered tincture of iodine. The 29th of September,



Plate V.

1901, Dr. Croft again consulted me. The condition was entirely unchanged since the 29th of July except that the sub-glottic node had plainly increased in size. I removed a piece with the Scheinmann forceps which showed the tumor to be hard. The microscopic examination of the removed piece gave now the signs of carcinoma.

Figures 1 and 2, plate I, show a section through this. Superficially the epithelium is markedly thickened. While the

superficial layers are cornified in places, in spots the regular structure is not recognizable and the boundaries toward the connective tissue are obliterated or less clearly defined than in the normal state. The connective tissue itself seemed infiltrated and in places invaded by epithelial formations. These in part stand in direct connection with the surface epithelium. In part they are represented as islands surrounded by connective tissue. The latter are particularly round while the nests



Ptate VI.

standing in close connection with the surface are many shaped, but both the nests and the islands reach far into the connective tissue. In the superficial epithelium ducts lined with endothelium and many formed mitoses are found, which appear also in the nests and in the islands. In one of the nests found in the middle of the slide, pearls are seen and in close proximity structures of which one could be in doubt whether they should be regarded as many nucleated giant

cells or cells melted together into a conglomerate formation. Figure 2 give these nests considerably enlarged. Similar appearances were also found in the other sections, especially pearls. Since the result of the microscopic examination seemed beyond question and it was scarcely possible to remove the growth on account of its subglottic situation endolaryngeally, I advised my confrere to submit to the laryngo-



Plate VII.

fissure. This was performed on the ninth of November by Prof. Gluck. After an introduction of the sponge cannula, the cricoid and the thyroid cartilages were split open in the median line and the right vocal cord removed. The course of the healing was uneventful. The patient soon began to swallow and visited me fourteen days after the operation. As a result of the operation adhesions formed in the anterior commissure from right to left. The voice was as good as be-

fore the operation. On the 20th of August I satisfied myself of the excellent condition of the patient, although to be sure the left vocal cord was still thick and red. The patient died on the first of March 1902, in the surgical division of the Friedrichshain Hospital.

The clinical history of the disease causing his death was one of stricture of the intestines, due to cancer of the colon. The microscopic examination of the portions of the intestines re-



Plate VIII.

moved at the time of the operation, showed adenocarcinoma with transitional change into cylindrical cancer. There existed, therefore, the primary cancer of the intestine and the condition several times observed, but still very rare, was present of one person being attacked by two separate carcinomas. Prof. Hansemann had the kindness to show me the microscopic section of the cancer of the intestines. He also performed the autopsy for me in a most commendable manner, on the second of March, 1902. He kindly permitted me to

examine the larynx. Figure 3 shows its inner surface. The cicatricial masses are visible which formed at the site of the extirpated right vocal cord and which extended from there to the left side. Looking from above, the diaphragm-like bridges in the anterior commissure which appeared in the laryngeal mirror are better seen. The white protuberance above the left vocal cord is an ecchondrosis which had arisen at the commissure of the thyroid cartilage after the opera-



Plate IX.

tion. Similar ecchondroses were found further down in the scar of the tracheotomy wound. These were situated upon the tracheal rings and gave rise to the spurs which are so often seen in the laryngoscopic examination of healed tracheotomies. This is, as far as I know, the first time that these structures had been demonstrated in the cadaver to be ecchondroses. The left vocal cord showed now in the hardened preparation a better defined border than I had observed in life. Traces of pachydermia can be seen at the right pro-

cessus vocalis; on the other hand the larynx is free from any suspicion of a return of the cancer.

On the ninth of November, 1901, the extirpated vocal cord was cut by the skilled hand of my assistant, Dr. A. Alexander, in a frontal direction into serial sections and imbedded on fifty-one cover glasses. These were, according to the Van Giesen method, numerically designated and colored with



Plate X.

microcarmine. Altogether, 453 sections were made; cover glass 1, most posterior portion of the vocal cord, cover glass 51, most anterior portion. Changes are recognizable in the sections which I regard as pachydermia and others which I hold to be carcinoma. The latter give pictures in which we can follow as far as it is possible in the anatomic preparations, the developing stages of carcinoma in an exceptional manner. On this account I have had drawn a large number

of sections from the series in question. The drawings were done in an excellent manner by the painter, W. O. Haase, and are true to nature, even to the individual cells. Every reader of this article can follow my conclusions as if he examined the preparations in the microscope with his own eye. For comparison, I give in plates X and XI, such sections as in my opinion represent neither pachydermia nor cancer. Figure 1, plate II, represents preparations 2 to 9 of the cover



Plate XI.

glasses. One may notice epithelial thickening with nest formation. The connective tissue is but little infiltrated. The basal cells of the epithelium are in part fibrillated but are regularly arranged. Nothing in the preparation suggests that it represents a section through the mass of the vocal cord, of which a few cover glasses further on give the appearance of a carcinoma. Figure 2, plate II, shows the third preparation of the 11th cover glass. In this can be seen, below, epithelial

nests in the neighborhood of which the connective tissue is decidedly infiltrated. Here is the locality where the carcinoma developed. In this section also it is impossible to recognize it as such as yet. One would think rather, the upper nest which spreads itself in different directions was the malignant growth. This however is not the case. The upper nest remains free from cancer formation and serves as a diagnostic mark for the locality where the cancer develops.



Plate XII.

The large cell with karyokinesis which is found at the base of the nest, cannot be regarded of value for the diagnosis of carcinoma. I was unable either in this or in any of the following sections to discover any difference in the mitoses of the upper and lower nests. The blood vessels of the infiltrated connective tissue were somewhat dilated in the lower nests. Three sections further on, the lower nest begins to grow into the interior and sends out shoots. In the neighborhood, yet separated from it, (preparation 6, slide 11, fig-

ure 3, plate II) are found small epithelial islands. Not a trace was discoverable of separation of parts of the epithelium, such as Ribbert describes in the beginning of cancer formation. On the next, the 12th slide, appears the first clear sign of cancer formation. The lower nest is split into many processes which pass over in part without a sharp boundary into the connective tissue. A comparison of this boundary in this slide with those of the preceding drawings offers much of interest. Here we find for example above the nest, epithelial islands which have no connection with the nest or superficial epithelium. The blood vessels beneath the infiltrated connective tissue are decidedly dilated. Alteration in the form of the mitoses could not be discovered. Plate III is a panorama picture for the examination of the region of the vocal cord in which the changes in question take place. The 7th section of the 13th slide represents this. The processus vocalis is seen which still shows the hyaline cartilage. Changes in the anterior end of the cartilaginous portion of the vocal cord are also seen. The upper nest as well as the carcinoma can be plainly seen. Figure I, plate IV, shows this area under a higher power of the microscope.

The development of the cancer is shown still more plainly than in the earlier slides. That is to say, the growth of the tufts into the deeper parts are shown, and their obliterated boundary distinctly noticeable on the left side of the processus vocalis. In the following sections these changes come more and more into view as well as the epithelial island formation. Figure 2, plate IV, which represent the sixth section of slide 15, is also an example of this. The upper nest remains unchanged. In section 2, slide 17, which plate V represents, the diagnosis of cancer is no longer in doubt. In addition to the nest formation, epithelial islands are found in the anterior portion which have no connection with the superficial epithelium. The epithelium here shows altogether an atypical character. Cells press into the connective tissue which do not present the form of basal cells. The epithelium itself is for the most part increased in size and shows in places a division of the nuclei and mitoses as well as vacuoli. Important changes in the mitoses of the healthy parts of the slide cannot be recognized. Between the upper nests and

the carcinoma an epithelial nest is visible which later disappears.

Nowhere are there any appearances from which the positive conclusion could be drawn that this case is malignant. The cancer formation appears still more plainly in the following section. In this the pearl formation also is seen as in plate VI, slide 13 section 3, while plate VII, slide 21, section 2, shows epithelial islands and nests but no pearls. From here on just as in the earlier sections, the carcinoma gradually passes into the relatively healthy tissue. Plates VIII and IX, which represents section 2 and 6 of slide 23, will show this without further explanation. In the last section the surface epithelium is thin and in places not present. The remaining sections in my opinion represent pachydermia but there occur however in places, peculiar appearances so that doubt easily can arise, whether cancer is not present in other spots also. I will refer to this question more at length later. There occur, for example, large nest formations which extend decidedly into the interior and send out daughter nests in different directions. These daughter nests are met in many sections and have no connection with the rest of the epithelium. If we go further into the series, the same connection is to be discovered. In many nests there occur pictures of cell division resembling in this way the appearance of glands. Again in other places a cavity has formed in the center which makes such nests resemble tubular glands, but everywhere there is a sharp differentiation from the connective tissue. The arrangement of the different forms of the epithelial cells, especially the basal cells, gives no considerable deviation from the normal structure.

The superficial layers are in places cornified. An active infiltration of the subepithelial connective tissue such as is present in the cancerous areas is nowhere discoverable. Small dilated blood vessels however occur in spots. The epithelial cells themselves are in places undergoing active nuclear division. There exist numerous mitoses and conglomerate cells which in places suggest pearl formation. The connective tissue shows hyaline degeneration in spots.

Plate X, represents 8 to 23 of the slides. In the lower nest karyokinesis is seen in the daughter cells. Below the

center, epithelial islands appear, pressing into deeper parts whose connection with the surface however, can be recognized, if we follow, the serial section further. The infiltration has definite boundaries. In the upper nests, in the part lying above the cleavage are seen large cells both anteriorly and in the deeper parts. Here also much splitting of the nucleus is recognizable. Plate XI, slide 41, preparation 1, shows the most anterior portion of the vocal cord. In the left upper part is seen an epithelial nest which has no connection with the surface. To the right appears a nest which resembles a tubular gland and three slides further on opens into the superficial epithelium as if by excretory duct.

When we extend these clinical observations in a critical manner there is no question that the first case is one of carcinoma. Both the laryngoscopic picture and the result of the microscopic examination are of one meaning as regards this. The first was that of a whitish growth showing loss of substance on the surface, situated on the right vocal cord, which had clearly advanced into the surrounding tissue. The microscopic examination showed epithelial islands with pearls deep in the connective tissue. At first one could perhaps be in doubt whether pachydermia had existed. The patient however showed reddened vocal cords, the epithelium of which was decidedly more opaque than normal. The unaffected left cord still shows pachydermia diffusa. No one can say with certainty whether the growth on the processus vocalis was to be considered pachydermia, or whether at the first examination on the 27th of March, 1897, was to be regarded as carcinoma. By everyone who had an opportunity to see him, including Dr. O. Brieger, Dr. Aronsohn and myself, it was diagnosed to be pachydermia. Further it did not recur after the endolaryngeal operation, but the growth proceeded directly from it and extended anteriorly. The positive evidence that cancer was present was first obtained by the recurrence which took place after the endolaryngeal removal, but this can in no wise be regarded as proof for the theory, we hope now entirely abandoned, that benign tumors can be transformed into malignant growth, through endolaryngeal operations. For the laryngoscopic picture and the pieces removed before the endolaryngeal operation had already

such a suspicious appearance as regards cancer that it was declared to be such by most physicians. Nothing was lacking except pearl formation to remove all doubt. The microscopic appearance prescribed imperatively its removal from the body as the proper therapeutic measure.

Recurrence took place from 16th of August to 30th of September. The patient stood the operation well and now is completely recovered and in possession of a voice not perfectly clear but still quite strong.

Very different is the second case. Here the clinical examination of the patient gives almost no aid in the diagnosis. On the right side of the larynx affected with pachydermia diffusa, a small nodule was observed subglottically and only a relatively rapid growth of the same gave us grounds to believe that something here was developing. The microscopic examination however, of the piece removed, left no doubt of the diagnosis of cancer.

We come then to a very important and debatable question, namely, that of the microscopic diagnosis of malignant growths.

Without wishing to exhaust the extensive literature of this subject, I would like to refer briefly to the chief phases of its development. More accurate information can be obtained in the authorities cited. Originally cancer was entirely a biologic conception. According to Johannes Mueller, through whose classical labors the anatomic ground work was laid, cancer was defined as follows: "All tumors in general can be called cancerous which attack the natural structure of all the tissues, which are from the outset constitutional or in the natural course of development become so, which are wont regularly to return after their extirpation and lead to the destruction of the patient." In this definition which all writers before Mueller adhere to, the finer anatomic examination is excluded in the diagnosis and as malignancy alone, i. e., the destruction of all tissues, metastatic formation, and finally the death of the individual, are made the signs of cancer, so all tumors which possess this malignancy whatever the character of the anatomic structure, were called cancer. In spite of this definition, the teaching of the finer anatomy of cancer begins with Mueller,

inasmuch as this great master shows that cancer consists of cells which are like other cells in the organism and in itself represents nothing foreign to the body.

On these grounds Virchow next showed that the component parts of cancer were epithelial cells. From the mass of malignant growths the conception of cancer was therefore limited to those whose parenchyma was made of epithelial cells. These epithelial cells are arranged according to Virchow in a particular manner, "They form alveoli," i. e., cavities which lie inside the diseased tissues and organs and are filled with cells of an epidermoid character. According to Virchow, therefore, the diagnostic sign of cancer consists in that the epithelium occurs heterotopically, in unsuitable places and shows an alveolar structure, i. e., a peculiar background or stroma, which gives it an arrangement analogous to glands but without any accompanying ducts.

An important step in the development of the anatomic study of cancer was made through the labors of Remak, Thiersch, and Waldeyer. Remak has declared that it is not admissible to regard epithelial cells as developing except from other epithelial cells. Thiersch showed in his studies that the cells of epithelial cancer developed out of the pre-existing cells of the healthy body. Waldeyer gave to this teaching still greater weight by the completeness of his individual observations. It is particularly interesting to look at Waldeyer's results in detail. I give here in a word his observations over the origin of cancer of the breast. This begins with a growth of epithelial cells in the acini themselves. For a long time even when the enlarged acini have reached already two or three times their natural size and have taken on all sorts of shapes, especially cylindrical and curved, a clear boundary is to be seen through the basal membrane,

To be sure the growth around the acini presses ever nearer the limiting membrane and the contour becomes ever more obliterated. Yet no one can be in doubt that it is still actually present. So far the new growth has not yet a characteristic appearance. With the further growth of the acini, however, which takes place the quicker in proportion as soft, young, less resisting connective tissue springs up around the pericinous growth, the clear boundary through the basal

membrane is lost. In place of acini we see now great epithelial masses piled up without definite typical form. In part there are large cylindrical tubes, in part round masses, here large and there small heaps. They present nowhere orderly arrangement, no where lumina are found but the entire alveolar space is filled with epithelial cells and thus we are, in my opinion, dealing with genuine cancer. The epithelial masses are still well separated from the small cell connective tissue growth. On the border of the large carcinomatous mass, as I have determined to name, these irregular collections of epithelial cells just described, the cells press closer together and have a short, round, cylindrical form as a result of which, under higher powers of the microscope, an optical boundary line is plainly visible. A true basal membrane is however no longer visible.

As for the mucous membrane and the outer skin, nests occur in place of the alveolar structure, which grow from the superficial epithelium into the depths of the tissue. But cancer also of the external surface takes its origin from the epithelium of the same. This conception regarding the origin of cancer from the preformed epithelium of the organism, is now generally regarded as correct. In the nomenclature, however, the terms of Virchow's theory still remain; for instance, we speak still of alveoli, although that which we now think of under this term no longer corresponds to a cavity which is filled with epithelium. The name which Waldeyer proposes, namely, carcinomatous bodies, has not gained general acceptance. The alveoli represent, as we must now admit, undefined areas of cancer growth. These stand in direct connection by means of more or less thick bands with the superficial epithelium or they are completely separated from it and represent then heterologic epithelial islands in the connective tissue which had their origin probably along the paths of the lymph stream, and take their rise through the individual movement of the emigrating and altered epithelial cells of the cancer. Such epithelial cells represent accordingly the beginning of metastatic formation, only they lie in close proximity to the original tumor. The second point in which the usual nomenclature has not followed the altered theories is the fact that we call, in cancer of the

external parts, the base of the cancer that which we now ought to properly call the apex. The base of the cancer lies in the superficial epithelium. Now it often occurs that this base is smaller than the largest diameter of the growth which can lie more or less deep in the tissue. That which we are wont to call the base, namely, the boundary portion toward the connective tissue, is always the newest part of the cancer. For a long time it was believed that we had in the demonstration of heterotopic epithelial nests, the anatomic expression for carcinoma.

Carl Friedlaender, however, showed that such atypical nests as he named them, are found also in other processes, i. e., in syphilis, tuberculosis and lupus, that accordingly the evidence of such nests does not permit us to diagnose cancer. With the pleasure often noticed in him of tearing to pieces firmly established doctrines, he declares that the definition of cancer on pure anatomic grounds is not possible and that in addition, the clinical history must be considered in the question of malignancy. Anatomically this malignancy is first observable in that in addition to the mother tissue of the cancer to which the subepithelial connective tissue also belongs, other tissues as muscles, cartilages, bones, etc., are attacked by the growth. It cannot be denied that pathologic epithelial tumors growing downward from the surface occur in other lesions as well as in cancer.

In the larynx, syphilis, tuberculosis and pachydermia especially come in question. Appearances such as Finder has given us in plate VI of the 8th Vol. of these Archives, in syphilis of the tonsils, are found also occasionally in the larynx in connection with the conditions just named. In polyps of the larynx also, as described by A. Alexander in his "Contributions to the study of benign growths of the vocal cord," in Vol. VIII of these Archives, page 258, epithelial cells are often found which reach far into the interior and grow together so that they can simulate independent epithelial islets in the connective tissue. Waldeyer describes in his thesis already several times referred to by me, found in the 55th Vol. of Virchow's Archives, page 107, a hazel sized tumor of the larynx which Voltolini sent to him and which showed altogether the external appearance of a polyp but the structure of a granular

carcinoma. Waldeyer regards the tumor to be a cancer which presented the unusual form of a polyp because there were found in the granulation tissue, in several places, entirely isolated islets of epithelial tissue, of the appearance of ordinary cancer bodies, and transitional forms could be traced in the far-reaching epithelial nests. According to the state of our present knowledge, I am in doubt whether we have to do in this case with a cancer or a simple polyp, and in spite of Waldeyer I am inclined to the latter view.

Plate XII, to which I will come later, gives an example of the existence of such a swelling in tuberculosis. I have myself several times declared that such atypical nests can only be called cancer if the structure of the normal layers of epithelium is no longer recognizable in characteristic sections and if no cells any longer lie in contact with the surrounding tissue by which we can recognize the form of the basal membrane in its long axis. For in this way the boundary between the connective tissue and the epithelium loses its sharpness and appears effaced. This deviation of basal cells from the normal condition is so much the more important as they represent the matrix of the epithelium. The grave disturbance of growth and nourishment of the epithelium is evident, when they disappear from their normal situation, and yet the epithelium continues to grow. In carcinoma the stimulus for the new growth of epithelium proceeds from the surface and downward, and this change finds anatomic expression in the atypical condition of the basal cells. But the cells which lie between the basal cells and the superficial epithelium, in order to complete the diagnosis of carcinoma, in my opinion, must be lacking in their normal structure, so that the entire nest can be described not only in form but also in the structure of the cells as atypical. Kuttner has disputed this statement of mine. The careful study of this subject which I have pursued has showed me that Kuttner is right to the extent that it can happen that an atypical arrangement of cells can be formed in epithelial growths also which occur from other processes. This however is a rare occurrence, and I am still convinced that as a rule such nests, atypical in the arrangement of their cells, belong to cancer. I say intentionally "as a rule" because exceptions

occur. In spite of this fact, however, the atypical arrangement of the structure of epithelium; with this limitation will always be regarded as of value for the diagnosis. Virchow and his pupils, as regards the anatomical diagnosis of cancer, hold fast even to-day to the theory that each new growth only shall be described as cancer which in its base shows alveoli formation with heterotopic epithelium. As regards this, however, there are several circumstances to be taken into consideration. In the first place Hansemann has shown that cancer produces death without advancing into the deeper parts.

The practical necessity of being able to diagnose cancer in the small pieces removed from the larynx carries with it the fact that we do not find in many cases the first metastasis which such epithelial islets represent, and also cannot expect to. Since we must strive to recognize the cancer at the earliest possible time, the best time for treatment would be needlessly consumed if we must always wait for proof of "alveoli." Finally Ribbert asserts that these alveoli are always connected with the surface even if by fine processes only. That we must be on our guard against taking diagonally cut daughter nests for epithelial islets, is well known. We can accordingly not always demand the demonstration of free epithelial islets for the diagnosis of cancer and must be as cautious in the valuation of them for diagnosis as with atypical nests.

Yet I would emphasize in order not to be misunderstood, that I hold positive proof of alveoli as the significant sign of cancer. Recently Hansemann has asserted in his book, the second edition of which has just appeared, "The microscopic diagnosis of malignant growths (Berlin, 1902)," that that which is named by him anaplasia of the cells can be regarded of value in the diagnosis of cancer. The anaplasia is found in such cells, according to Hansemann, as have lost their different testing properties and have taken on individual development. This is accordingly a biologic designation. The malignancy is transferred into the cellular tissue. What we call malignant in the tumor, Hansemann calls anaplastic in the cells. This is certainly a valuable term. Its practical meaning however would first come into question when we

succeed in discovering the morphologic signs for the anaplasia in the cells. Hansemann, although with considerable reserve, advances the value of mitoses in this relation. He says, page 96, that he has found asymmetrical mitoses always in carcinoma, at times in sarcoma, never any where else. Nevertheless he would not upon such condition alone be willing to make the diagnosis of cancer. On the other hand, he says again that certain changed characters of the mitoses are found alone in the malignant growths and in no other regenerative or hyperplastic growth. If these observations of Hansemann's are confirmed, the abandoned heterology of the cancer element would again be called into discussion.

Cells which in their mode of development vary from all others which we observe in the normal organism represent something foreign to the body, accordingly something heterologous. In order to clearly see mitoses we must harden the tissue while yet blood warm and preferably in sublimate solution. This presents no difficulty for the section removed from the larynx for examination purposes. We can throw the pieces removed by the forceps conveniently into a sublimate solution. I have not succeeded however in being able to recognize in the character of the mitoses extensive differences compared with other processes in the larynx. Where we find numerous cells with mitoses we can always expect active tissue growth. This I have not been able to discover in cancer of the larynx. I can however console myself for my inability in the determination of the anaplastic mitoses, in that skilled pathologists, such as Ribbert for example, could not succeed any better than I.

There are still several other points which come into consideration in the diagnosis of cancer. I will here mention, in the first place, infiltration of the connective tissue. Waldeyer distinguishes between an introductory and an accompanying connective tissue development. Apart from the fact that carcinoma, like foreign bodies, gives a collateral irritation to the surrounding tissue, infiltration of the connective tissue in cancer of the external parts is an expression of disturbed good understanding which exists otherwise between the connective tissue and the protecting epithelium. There are found, however, around the acini of the cancer tissue, diseased

glands but they must be regarded with great caution for diagnosis, inasmuch as they are lacking in many cancers and occur in other conditions. The theories of Klebs regarding the condition of the blood-vessels in their significance to the diagnosis of cancer have already been criticised by Kuttner at length. On the other hand it is unmistakable that the presence of the so-called pearls and conglomerate giant cells in the larynx is of value. In the other organs less is to be concluded from the presence of this picture than in the larynx, where the presence of pearls and such conglomerate cells is described by different authorities as a sign which makes the diagnosis of cancer probable. Nevertheless pearls occur in the larynx also without carcinoma. At the International Congress at Paris I mentioned for example in my paper regarding the diagnosis of cancer, a case in which, in recurring papilloma of the vocal cord in an old man, we found pearls at a circumscribed spot. With the exception of this one place, the piece which was removed was certainly a papilloma. The tumor has not returned since the last operation in 1900 and the patient is entirely well.

In plate XII, I give as a further example the drawing of a preparation which is of interest in this particular. It is that of a patient in the middle of his fortieth year who shows on the ventricular fold, tumor-like thickenings. These were regarded for other reasons as cancer. The history of the patient was that he was a hard drinker and had constitutionalsyphilis and that he also coughed up blood. The examination of the lungs gave suspicions of tuberculosis. We had accordingly in the history of the patient an unusually large choice as regards etiology. In the pieces of tumor which I removed with the cutting forceps were found the conditions which I reproduced in plate XII. A large pearl lay in an epithelial nest which shows cells still basal and provided with a long axis though much disturbed in their regular arrangement. In other portions of the preparations, however, tubercular miliary nodules were found in the connective tissue, so without question tuberculosis existed. Later tubercular cells were found in the expectoration. The patient went into an institution for cure of diseases of the lungs after an antisyphilitic course of treatment had been

carried out. The tuberculosis however was not checked and two years later he died of consumption aggravated by albuminuria. In the larynx no further appearances of the tumor had shown themselves so we can confidently say it was not a case of carcinoma. The patient died some distance from here and I only recently heard of his disease. The autopsy, as much as I wished it, was not obtained.

With the exception of keratosis and pearl formation, other signs of retrograde metamorphosis of cells such as fatty degeneration, hyaline softening and so forth, in beginning cases, which are for the most part treated by us, have come less into consideration in the diagnosis. If we now group together these several observations which pathologic anatomy offers us for the diagnosis of cancer, we can say with emphasis that there is nothing pathognomonic by the recognition of which we can with certainty say that cancer exists. Carcinoma shows nothing which compares with the diagnostic value of the miliary nodules with their giant and epitheloid cells in tuberculosis. Waldeyer says rightly that we must assert without exaggeration that until we possess a sure anatomic diagnosis we will never establish the clinical diagnosis as it ought to be. It is therefore scarcely surprising if the same author in another place in this connection advances the following: "the idea of being able to make a prognosis from the anatomic examination alone, regarding the benignancy or malignancy of a growth must be given up; the malignancy of a tumor depends not alone on the anatomic structure, but upon very many conditions which arise partly from the locality of its development, partly from the condition of the patient. The same tumor which according to anatomic classification is regarded by one authority as altogether benign may by another be regarded as most malignant." Similar to these statements of Waldeyer, are those of many other authorities, and in the laryngeal literature there are many opinions of well known specialists in which the anatomic examination for the diagnosis of the tumor is regarded as worthless.

Under these circumstances it is not more than natural that many of us are looking toward *the promised land*, to the results which etiology gives us hope will be accomplished. The

certainty which we have obtained in the diagnosis of tuberculosis and other bacterial infectious diseases gives new encouragement to the wish to obtain similar results also in the diagnosis of cancer. Many circumstances make it probable that cancer also owes its origin to an infection. As debatable as this question still is, I am inclined to agree with those who would ascribe the origin of carcinoma to a *contagium vivum*. In tuberculosis before the discovery of its infectious nature, that which clinical and pathologic anatomy recognized in it as infectious was ascribed to a caseous collection of older date. The infectious material was said to develop in the body itself and spread through from some focus outward.

Now we know that the caseous center consists already of tubercular bacilli, and that the low condition of the system advancing from outside into the organism produces tuberculosis.

In cases of cancer, communications are multiplying in which the disease is reported in certain houses. It is also not to be denied that inoculation experiments from animal to animal, have turned out positively although they offer still much perplexity. Thus in the inoculation of *carcinoma keratodes* there occurs a pavement epithelial cancer. A carcinomatous peritonitis also resembles a tubercular peritonitis to a surprising degree. In my opinion, however, the deciding point is that the observation of a case of cancer forces the suspicion directly upon us that a *contagium vivum* lies at the foundation of cancer. At some place in the body there arise small epithelial swellings which in time cause a complete revolution in the character of the epithelium. These cells thrown as regards their nourishment upon neighboring parts destroy all tissues which they can reach. They form metastases whether in the form of epithelial islets or in other organs. Those authorities which deny the infectious nature of cancer assume that the metastases are brought about through the lymph stream or through peculiar movements of emigrant epithelial cells of the tumor. It is therefore a case of transplantation not of infection. But these epithelial cells carry, everywhere they come, the capability of destroying in the same manner as the cells of the original

tumor, all the neighboring parts and show a growth almost without limit.

I am at a loss to understand this peculiarity of cancer cells except on the theory that they possess some sort of fermentation. If this conclusion is correct we are forced according to the present standpoint of our knowledge necessarily to the acceptance of a *contagium vivum* which calls forth the cancer and renders possible its further extent in the body. But unfortunately it has been up to the present time a subject of conjecture alone. For in spite of all the labor and research science at the present time has not yet succeeded in demonstrating this *contagium vivum*. In very many places, poor investigating mortals have busied themselves with this and they are not the least talented and experienced who with all the help of our art are striving to solve this puzzling question. The announcement that the contagium of cancer is found, comes and goes like its predecessors only to sink after a short time into the historical lumber room or into the rubbish heap of oblivion. One fact presents itself now clearly, namely, that with the present methods known to bacteriology the *contagium vivum* of cancer cannot be discovered. For the moment, accordingly, the ameba also come into the foreground. In cancer there are cells, as Waldeyer first demonstrated which show, in a proper preparation under the microscope, individual movements. Dr. Feinberg declares that the ameba, which Leyden has described, is no ameba at all but a well known wandering cell. Feinberg describes another form which he found in carcinoma. We can devote no more time to his communications than to merely mention them. Perhaps they also belong to the cell inclosures which already have been taken erroneously for microbes.

At the session of the Cancer Committee, on the 22 of March, E. von Leyden demonstrated birds-eye like growths which are found in cancer cells and which he holds as the probable cause of cancer. Dr. Feinberg showed me his slides on March 25, and as far as I was able to perceive, his bodies are identical with those Leyden has demonstrated to us. The proper practical value of this exciting agent of carcinoma can be first determined when we possess it outside the body. COLOR also which up to the present time has of-

ferred so many veils by which nature has closed her secrets to our eyes, seems to be denied in the case of cancer. Pianese has occupied himself most actively with this question. His colored drawings, which at first glance seem like a March dream, represent wonderful and at first glance strange cell formations, but Pianese shows with the aid of accompanying drawings, that all these remarkable appearances have to do with changes in the cells and their nuclei and not with the ameba.

But the practical need of our science pressingly demands ability to make an early diagnosis whether cancer exists or not.

The possibility of saving the patient's life stands in direct proportion to the rapidity of the diagnosis. The clinical picture in many cases unfortunately leaves us no doubt whether cancer or some other cause lies at the bottom of the observed swelling. In two diseases indeed we are able to make positive diagnosis by clinical examination. One, when it is a case of tuberculosis and the other when it is a case of syphilis. In tuberculosis we can, when other methods fail, obtain positive results with great certainty by means of the tuberculin injection test. In syphilis we may draw conclusions from the remedies employed yet with some degree of reserve, for it is known carcinoma also can for a length of time improve under the use of iodides.

But there remains, even if one has time to employ these diagnostic remedies, always a group of tumor-like lesions in which the clinical picture gives no aid in making the diagnosis at the proper time. In not an inconsiderable number of growths in the larynx the laryngoscopic picture for example does not make it possible for us to safely decide between papilloma and pachydermic processes on the one hand and carcinoma on the other. Here I will call attention to the instructive examples which Chiari has collected in the eighth volume of these Archives. In such cases we can only make the diagnosis certain by the microscopic examination of the portions removed. This method of examination has been much used in cases in which syphilis or tuberculosis exists, but in which from the visible appearances, we do not at once recognize these diseases. It is also not to be mistaken that this offers us much more quickly than all others a

certain basis for our therapeutic measures. But ought we to draw conclusions or not from the microscopic examination of the pieces removed? I have had here a very large personal experience and can give assurance that those cases in which we can draw positive conclusions out of pieces removed represent by far the great majority. In many cases a clear picture of carcinoma is seen even in the small pieces. The second case reported by me above, is an instance of this. I could add many others and have published such in my early writings.

In other cases we see the characteristic picture of miliary tubercle nodules, i. e., giant cells in the neighborhood of epitheloid cells. Then we know it is a case of tuberculosis. Again in others³ the picture of pachydermia or papilloma is presented. But there remains a series of cases which give us pictures from which no positive conclusion can be drawn and where we must remain in doubt whether we have to do here with inflammatory processes alone, syphilis, carcinoma, or tuberculosis; conditions of which the microscope gives us suggestions without offering positive proof. Before I proceed to discuss the subject of the microscopic picture which leads us to positive conclusions, I would like to advance the assertion as regards our therapeutic measures, that the endolaryngeal method offers in all doubtful cases the unconditional advantage. In such cases we can, in fact with calm conscience and without any hesitation, employ the endolaryngeal method since carcinoma if present will show its presence beyond question on further examination.

I am convinced that the following circumstances point to cancer: In the first place epithelial nests which reach deeply in different directions into the connective tissue and which present an irregular structure especially the lack of basal cells and an obliterated boundary toward the connective tissue. If there are in these nests in the larynx also giant cell-like conglomerate cells and pearl bodies the diagnosis can be made with a probability bordering upon certainty. It is strengthened by the presence of atypical epithelial islets (alveoli) in the connective tissue which are not connected with the surface. As regards the significance of asymmetrical mitoses and specific microbes, the future must determine. A preparation

which includes not merely epithelium but also encircling connective tissue is always essential for the diagnosis of cancer. We must not content ourselves with the removal of the superficial structure merely. In papilloma there is a moderate thickening of the epithelium which grows outward and which is separated from the connective tissue by well defined basal cells and a sharp boundary. The connective tissue sends papilli, i. e., vascular loops into these epithelial masses. Most difficult is the positive diagnosis in many cases of pachydermia when there exists nest formation below the surface. Here the structure of the epithelial cells and the boundary between them and the connective tissue must serve as a guide in our decision. But we must not omit to mention that the picture of carcinoma as a whole presents something in itself right characteristic; we see at the first glance what an organism is on one hand and a machine on the other. If we desire however to define this difference we are immediately in difficulty. It is just the same as regards cancer. An experienced observer can in many cases say with certainty from the general appearance that this is carcinoma, though it might be perhaps hard for him to demonstrate this to another person who is in doubt. The carcinoma of the larynx with its pearls, etc., is most easy of recognition at the first glance. The unusual gland carcinoma presents also a typical picture. Difficulties however arise if it is a case of simple so-called medullary carcinoma.

When we turn after these remarks again to our previously reported cases there can in the second case, in my opinion, be no doubt that a carcinoma was present in the extirpated vocal cord. The evidence of this is contained in the description of the preparation. Difficulties first begin when we attempt to establish the limits of the carcinoma. Is the epithelial nest in plate V which suddenly developed, carcinoma or pachydermia? Is the great nest in plate X cancer or only pachydermia? Sections from the left vocal cord of the second case give excellent examples of the fact that epithelial nests which are many shaped do occur in pachydermia and extend to a considerable depth. With the permission of my colleague, Von Hansemann, I removed a piece from the free portion of the left vocal cord which Dr. A. Alexander again

kindly cut into serial sections. In the examination of these slides we must remember that they were removed from the cadaver, and from a larynx lying for a long time in Kayserling solution which had been reproduced in a drawing before this particular piece of the vocal cord could be removed. The vocal cord itself had been observed laryngoscopically for a year by me and I had never seen anything else in it but a pachydermia diffusa. Further, nothing had been noticed in the cadaver itself as the section protokol shows, which in the least could have excited the suspicion that a malignant neoplasm was present in it. We can on this account affirm more positively than is generally the case in cadaver preparations that there was present here only a pachydermia and yet the so-called atypical nests reaching into the depth and partly branching, are seen in the preparation. Figure 4 gives the fifth section of the fourth slide. The fissure which is seen in the lower portion is found in all the sections of the entire series. All the nests however are separated from the connective tissue by a sharp line and show here well formed basal cells. We can perhaps note striking changes in the form of the cells, i. e., large cells with vacuolar formation. The upper layers of the epithelium are deeper stained, and certainly not alone due to their presence in the Kayserling solution. In places the epithelium is entirely lacking and where, as is shown in the drawing, the surface is covered by thick masses of epithelium, the upper layers give the impression as if something were lacking there. The nests which press from the layers of the thickened superficial epithelium into the depths are distinguished from the latter not merely as regards their color. In this particular we may observe the upper portion of the drawing. Here the nests give the impression as if they were younger than the upper layers. It appears here also in many places as if the basal cells of the upper layers were pushing papilla-like into the nests. The particularly characteristic infiltration of the connective tissue is no where present. Marked difference in the large variously shaped nests of the right side are not discoverable.

Finally if we come to the anterior portion of the right vocal cord there can be no doubt that it is not a case of cancer but only one of pachydermia. But transitions from these

appearances to the actual carcinoma give excellent examples of the difficulty of the diagnosis. I have no doubt that many would extend the boundary of the carcinoma further than I have placed it. I have placed the limit of the carcinoma where a regular structure of the epithelium is present in the atypical nests especially of the basal cells near the connective tissue. Others will regard the nests which I have already called pachydermia, which are pressing into the depths found in the neighborhood of the cancer, as cancer, perhaps on account of their nearness to it. Until mitoses, microbes of allied structures have been freed from all question of doubt, the estimation of such pictures will depend upon the discretion and experience of the individual observer. If the diagnosis is to be followed by a surgical therapeutics, we ought as little as possible to be content with merely grounds of suspicion. We must rather complete the objective proof beyond a question of doubt. We have accordingly in the two cases, reported examples of the phenomenon which has already often times been observed and reported in the literature, that cancer may develop on the soil of pachydermia. He who wishes to set in motion the music of the future can occupy himself with presenting theories regarding the etiologic connection of the two conditions. Both the cases reported have certainly great interest pathologically and they are also worthy of note, in that, in both cases the cancer of the larynx was altogether healed. In case two this is demonstrated in the cadaver. The first case is still alive four and a half years after the removal of the cancer and is entirely well.

IV.

LARYNGEAL PARALYSIS AS A PRIMARY SYMPTOM OF TABES DORSALIS; WITH REPORT OF CASES.

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Tabes dorsalis, as defined by Prichard, is "An organic disease of the periphero-central sensory nervous system characterized symptomatically by incoordination, sensory and trophic disturbances, affections of special nerves, the optic and ocular particularly, and involvement of the sphincters."

This dual cause of the classical symptoms of locomotor ataxia, periphero-central nerve degeneration, likewise explains the occurrence of the manifold and not uncommon paralytic and spastic affections of the larynx.

Until recent years incipient tabes as a causative factor of otherwise unexplained interference in laryngeal innervation remained entirely unrecognized, while its true status is even now rarely appreciated. On the other hand, paralysis as a complication of advanced spinal sclerosis has been so well studied and described that the possibility of its occurrence is universally recognized.

In one hundred cases where the general condition was well advanced, Semon found fourteen with some form of laryngeal paralysis, and of 122 cases examined by Gerhardt, seventeen were so affected.

Grouped according to the lesions discovered, we find:

Unilateral posticus paralysis.....	14	cases.
Bilateral " "	8	" "
Unilateral recurrent "	5	" "
Bilateral " "	1	" "

In the three remaining cases, complicated conditions not permitting of exact classification were found.

Semon has recently reported an additional case of bilateral recurrent disease, making two in all.

Thus in 222 consecutive cases we have 31, or $1\frac{1}{2}$ per cent. with complete or partial paralysis of the motor nerves of the larynx, and yet this percentage, large as it is, does not correctly portray the frequency of laryngeal complications, for aside from these cases of paralyses, instances of disturbed sensibility, spasm and crises are not rare.

The failure to appreciate the frequency with which these conditions occur is due to the fact that the lesion most commonly produced, unilateral posticus paralysis, causes no subjective symptoms. The voice is unimpaired and the respiration unaffected except upon unusual physical exertion. Owing to the general condition this effort is seldom made and hence the lesion may exist for years unsuspected.

The lesions which cause aphonia and dyspnea are rare and as laryngeal examinations have not been systematically made in tabetic subjects, except where there is subjective evidence of laryngeal abnormalities, the true percentages have never been definitely ascertained. Moreover, all published reports deal simply with paralysis occurring in those with advanced or at least recognizable spinal lesions, whereas, the true clinical importance of the subject has little connection with this class, for here we are confronted with a well developed disease, incurable and easily diagnosticated, with a laryngeal complication that adds, as a rule, but little to the general suffering.

As a premonitory symptom of the general affection, however, these local changes are of the utmost importance, as they occasionally permit the making of a diagnosis that would otherwise be impossible.

It is this phase of the question that has suffered almost total neglect, and it is surprising that in no American or English text-book with which I am acquainted is this pre-ataxic paralysis described. In 1896 Hajek of Vienna called my attention to such a case and spoke at length upon its occurrence, and yet it has never been considered except by a few German investigators.

The known frequency with which these paralyses, antedating all other symptoms, have been observed and their innocuous nature which does not lead the patient to seek medical advice, make me believe that they are symptoms of rather

common occurrence. As their existence can be discovered by chance only, many a case of ataxia may have had this sign without its being recognized. In none of the published cases nor in mine, where a paralysis was found complicating advanced tabes, was it known or discoverable how long the condition had existed, and it is a fair assumption, in view of the known cases in which it has preceded all other manifestations, that in some of them it may have been the first instead of one of the late symptoms.

A paralysis of abduction, unilateral or bilateral, for which a causative factor cannot be discovered, should always arouse a suspicion of locomotor ataxia; if all other symptoms are wanting the patient should be kept under close observation and examined from month to month, and in many instances after a considerable lapse of time, from six to twenty-four or even thirty-six months, a diminished reflex, an Argyll-Robertson pupil or some other manifestation will develop and disclose the true factor.

The pathologic reason for the development of these paralyzes so far in advance of all other changes is not definitely known.

In a large majority of the cases studied post-mortem the lesion found was a degeneration of the peripheral nerves. This has affected either the recurrent alone or the trunk of the vagus. In many the medulla has been involved but the nuclei were generally free. The same pathologic changes would undoubtedly be found in the pre-ataxic form. It is well known that the first alteration, either as a degeneration or a neuritis, is sometimes found in the oculo-motor or optic nerves, and the same may well be true of the vagus or recurrent.

Unilateral posticus paralysis has been rightly termed "the tabetic larynx par excellence," for in a large percentage of the cases, both where the lesion occurred as an early and a late manifestation, loss of power in the posticus was first observed. This condition runs its course symptomless and commonly persists, unchanged, for years or even throughout the entire course of the disease.

Bilateral posticus paralysis, the form next in frequency, occasions but slight alteration in the voice, and dyspnea is

always produced. Recurrent disease, unilateral or bilateral, has never been seen as a primary lesion.

There occasionally occurs a transitory (functional) paralysis of the adductors, but the first lesion is almost invariably one of abduction. In all organic paralysis the posticus is the first muscle to suffer, probably because of greater vulnerability, although the true pathogenesis is unknown. By the time other muscles are involved, in the disease under consideration, the general symptoms are well advanced and thus it is that we see but this one form as a pre-ataxic condition. It might be possible for the degeneration to have advanced to such a degree that complete recurrent paralysis had developed before other organs or muscles were involved, but such cases have not been observed and I doubt the probability. Posticus paralysis usually remains stationary a long time while the spinal sclerosis steadily advances. In addition to paralysis we occasionally see instances of laryngeal crises, either independent of paralysis or in connection with it. Either of these forms, the uncomplicated crisis or the crisis in connection with a previously developed paralysis, may develop as the primary symptom, although they usually belong to a later stage of the disease.

The crisis is distinguished by a peculiar sensation or irritation accompanied by severe attacks of coughing, and occasionally by dangerous suffocative seizures. To these symptoms there is added an almost characteristic crowing inspiration like that of laryngismus stridulus.

Ataxia of the cords and increased or diminished sensibility may likewise accompany the general process. These conditions have been minutely described, however, and are not within the purport of the present paper, never having been observed in advance of other symptoms.

The points to which I have desired particularly to attract attention are the following:

1. Laryngeal paralysis, as a complication of tabes, is present in about 15 per cent. of all cases.
2. Paralysis may precede all other symptoms by from six months to three years.
3. This primary paralysis is always limited to the posticus muscle and is usually, if not invariably, unilateral.

4. The process usually remains limited to this muscle for years or during the life of the individual.

5. This primary paralysis is fairly common; the true percentage will never be ascertained owing to the long absence of subjective symptoms.

6. When the cause of an abductor paralysis cannot be accurately ascertained, locomotor ataxia must be considered.

7. That it is frequently of great diagnostic importance, in that it will draw attention to the general condition and thus sometimes uncover an unsuspected ataxia.

8. In all cases where the diagnosis of tabes is doubtful, a laryngeal examination should be made whether or not there be subjective laryngeal symptoms.

Cases.

1. Unilateral posticus paralysis antedating other symptoms by at least fifteen months:

Male, aged 46. Previous health good. No history of syphilis or alcoholism. In April, 1897, he consulted me on account of obstructed nasal breathing, due to a large nasopharyngeal mucous polyp. Laryngeal examination revealed a paralysis of the left posticus muscle. How long this had existed it is impossible to state. Nothing in his past history or present condition gave any clue to the causative factor. Kali iodid, strychnine and intra-laryngeal galvanism produced no effect, and after two months the patient discontinued treatment.

In September, '98, fifteen months after the first examination, he returned and a diagnosis of ataxia was made. For the past six weeks there had been lancinating pains in the lower limbs and examination showed diminished but not abolished patellar reflexes, Argyll-Robertson pupils and impaired tactile perception over the plantar surfaces of the feet. Romberg's symptom and other signs of ataxia were absent. The laryngeal picture was unaltered.

2. Paralysis antedating general symptoms by seven months.

Male, aged 39. Syphilis seven years ago. Had continuous treatment for over two years without subsequent symptoms.

Past history is otherwise negative. Married and has three healthy children.

In December, 1898, in the course of a general examination of the nose and throat, I found a paralysis of the left posticus muscle. Syphilis was the only etiologic factor in evidence. Treatment for seven weeks made no impression. In the latter part of June, '99, seven months after the discovery of paralysis, the laryngeal condition had not changed but Romberg's symptom was present, there were slight vesical and rectal irritation, diminished reflexes and pin-point pupils. How soon these symptoms had developed after cessation of treatment I do not know, but I had seen him on the seventeenth of April, four months after his first visit, and at that time they had not become manifest. In January, 1900, I saw him for the last time and all the tabetic symptoms were increased, but the paralysis was still limited to the posticus.

3. Right posticus paralysis antedating other symptoms by twenty-two months.

J. B., colored, aged 37. Laborer. Had chancre fourteen years ago. Previous to treatment for an inflamed pharyngeal bursa, a laryngeal examination was made with discovery of the paralysis; as in the other cases, nothing could be learned of the probable date of development. Repeated examinations failed to uncover any cause other than possible pressure due to enlarged glands. Specific treatment failed to produce any improvement. Twenty-two months from date of first visit he reappeared—six examinations in the interim proving negative—with a history of gradually failing eyesight. The laryngeal paralysis had not advanced but examination of the eyes showed beginning optic atrophy. Several months later other symptoms developed and the picture became typical. A short time after this I came west and lost sight of the patient.

I have then a personal record of three cases of undoubted pre-ataxic paralysis, which, with the case seen in the clinic of Hajek, makes four in all in an experience of a little less than seven years. In addition I have one other case to report where the diagnosis is still in doubt but which I expect to become ataxic.

This record is all the more remarkable from the fact that I

have not had an opportunity of examining or seeing any cases of incipient tabes aside from those that came to me for some throat lesion.

4. Male, aged 52. Russian. No specific history; the patient spoke but imperfect German and hence no accurate history could be obtained. Three weeks before he first consulted me there had been an attack of acute laryngitis. Under treatment the voice soon gained its normal pitch and clearness with a partial return of the hoarseness two weeks later. When I first saw him, both cords were slightly congested and the left cord would not abduct. In three days the hyperemia had completely disappeared and the larynx was apparently normal except for the paralyzed cord. No local cause for the impaired motion was discovered.

A general examination revealed an Argyll-Robertson pupil and a double aortic lesion. Under general treatment the general condition improved and in a few weeks he was apparently well except for the cardiac lesion that had ceased to bother him.

The affected cord had regained at least one-half its normal motility, but at that point remained stationary.

I am confident that if this case can be kept under observation, the presence of tabes can sooner or later be proven, for a posticus paralysis with an Argyll-Robertson pupil is almost definitely diagnostic. We have here, however, two confusing factors; the double aortic lesion and the improvement upon the affected side.

With the lesions of the valve there might be a slight dilatation of the aortic arch sufficient to cause pressure but not large enough to be demonstrable.

That a diminution of such a dilatation, if existent, sufficient to partially relieve the pressure symptoms, could occur within a few weeks without the patient being at absolute rest, I do not believe.

The partial return of function in the paralyzed nerve may invalidate the claim of tabetic degeneration or neuritis, but in the ocular and optic nerves we have many parallel cases. Paresis of the ocular nerves in locomotor ataxia is frequently transient, reappearing later as a permanent condition; in the course of optic atrophy remissions may occur and the Argyll-

Robertson pupil may occasionally completely disappear and remain absent during the further progress of the disease.

It may be that in this case we have an instance of transient improvement. There are no recorded cases of a like nature but in view of the parallel conditions of the optic and oculo-motor nerves, there is reason for believing that such is the case.

I realize that the history of this patient can be of no definite value without further observation; it is recorded merely to show the frequent difficulties of diagnosis and the importance of considering the possibility of an incipient tabes existing, even when there are almost no general symptoms to support the supposition.

1427 Stout St.

V.

THE TREATMENT OF RECURRENT MASTOIDITIS.

BY EDWARD BRADFORD DENCH, M. D.,

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The complete mastoid operation as ordinarily performed, is sufficient in all cases to relieve the patient from the immediate danger of suppuration within the pneumatic spaces of the temporal bone and is usually, in the great majority of instances, followed by the complete relief of all symptoms.

Looking over the notes of a large number of cases operated upon. I find that in very few instances have there been any recurrent attacks of mastoiditis. In almost every instance, the operation wound has healed perfectly in the course of a few weeks or months. In a very small proportion of cases which have come under my observation, both at my clinic and in private practice, the operation has not been followed by a complete cure. By this I mean, that occasionally a small sinus has remained behind the ear, and the probe introduced into this has been able to detect exposed bone at the bottom of the sinus. I am fully aware of the fact that in a certain small proportion of cases complete healing of the wound takes place only at the end of several months. This delayed healing does not, in any way, indicate that the operation was incomplete or that it was imperfectly performed. Such delayed healing usually depends upon an impairment in the general health of the patient, as the result of which reparative processes are much delayed. The mere presence of a small area of exposed bone at the bottom of a sinus, following the mastoid operation, does not

call for immediate operative interference, provided the wound appears healthy, and the patient has no symptoms which can be logically referred to this local condition. Patient and careful treatment will probably bring about a complete closure of these sinuses, even after they have existed for one or two months. In a certain class of cases, however, we find that a sinus will persist for from six to twelve months after operation, and that the probe will reveal not only exposed bone but softened bone at the bottom of a long narrow fistula; the walls of such a fistula, and usually its orifice, will be covered by unhealthy, exuberant granulation tissue; in fact, we are certain both from tactile examination and ocular inspection that there is carious bone at the bottom of the sinus.

In another class of cases, the mastoid operation is apparently followed by complete cure. The wound heals sometimes rapidly, sometimes slowly, but eventually closes completely and the patient seems to be in perfect condition. At some period, varying from a few months to one or two years perhaps, the patient will complain of pain in the ear, and this pain will be followed by pain in the mastoid, mastoid tenderness, and finally, by the development of a post-aural tumor occupying the cicatrix of the old mastoid wound. This post-aural tumefaction comes on quite rapidly in young subjects, and not infrequently is the first sign noticed by the parents. The child may complain of but little or no discomfort about the ear, may seem only slightly indisposed and fretful and quite frequently the first symptom referable to the ear will be the development of the post-aural tumor.

During the past few months I have operated upon nine cases in which a previous mastoid operation has been performed and in which either a sinus has persisted for several months or in which the patients have returned with a recurrent inflammation of the mastoid structures. In all of the cases of which I am now speaking, a second operation has been performed. The exposure of the parts has invariably revealed the presence of dead bone in the tympanic vault, In a number of cases, the ossicles themselves have been carious, but sometimes the ossicles have been practically normal, the caries being limited to the walls of the tympanic vault.

One of these cases had been previously operated upon by myself. The other patients were referred to me from other sources. It has been my practice in these cases to perform a radical operation in every instance. By this I mean the ordinary Stacke-Schwartz operation, the middle ear, mastoid cells and external auditory canal being converted into one large cavity. In all of these cases I have subsequently lined the operative cavity with Thiersch grafts taken from the leg. The results in all cases but one have been entirely satisfactory. In one case a fatal termination took place from intracranial infection, this condition undoubtedly being present before the operation was performed.

Looking over the histories of these cases, I have found that in a large number of instances the patients had been suffering from a chronic purulent otitis, of long duration, before the first operation upon the mastoid was performed. In other words, the primary acute mastoiditis was due to a preceding chronic suppurative otitis media, and did not follow an acute inflammatory process in a previously healthy ear.

I have been led to bring this subject before this Section for the reason that I believe this series of cases should teach us that whenever we have to deal with an acute mastoiditis, in a patient in which the affected ear has already been the seat of a chronic purulent inflammation, we should not be content with relieving the immediate acute symptoms by doing a simple mastoid operation, no matter how thoroughly this is done, but I believe the procedure indicated is one which will not only relieve the suppuration within the mastoid, but will at the same time cure the suppurative otitis as well, and will protect the patient from the possibility of any further trouble in this direction. It is now my practice whenever a case of acute mastoiditis presents itself at my clinic, to go over the case carefully, and to find out whether the patient has ever had an aural discharge previous to the present acute attack for which he presents himself for treatment. If I find that there has been from time to time a discharge from the ear, I immediately do a radical operation, instead of the simple mastoid operation. By the simple mastoid operation, I, of course, mean an operation in which every vestige of the cellular structure of the mastoid is

broken down, and all of the pneumatic spaces obliterated. This includes the removal of the tip of the process, and also the destruction of zygomatic cells, if these are present, and the establishment of a free communication between the middle ear and the operation cavity. In cases of acute mastoiditis in which the ear has not been the seat of a chronic supuration, such an operation yields extremely satisfactory results. Recurrent mastoiditis, in these cases, is no more apt to occur than was the initial attack. In fact, although we have no figures upon which to base this conclusion, it is probably less liable to occur than in a previously healthy ear, as the firm cicatricial tissue, which supplies the place of the pneumatic spaces, offers an unfavorable nidus for the development of pathogenic organisms. If, however, this operation is performed in a case where intratympanic caries has previously existed, it will not infrequently be found insufficient to protect the patient from future attacks. Even if the wound heals perfectly, and it does in many of these cases—the patient is in danger of suffering at some future period from another attack of acute mastoiditis. It should, therefore, be the rule, I think, considering what we have learned from those recurrent cases operated upon to protect the patient from these possible subsequent attacks, by removing every vestige of carious bone from the tympanic cavity, and to obliterate that cavity so completely as to prevent its constituting any further menace to the patient. If this is done, attacks of recurrent mastoiditis will be very much less common.

The same rule then applies in operating upon a case for the first time. If there is any evidence of a previous purulent inflammation, the operator should not be content with doing the simple mastoid operation, but should at once proceed to perform the radical operation.

Whether or not the wound should be closed at the time of the primary operation must depend upon several circumstances. If there is a large post-aural abscess, the soft parts will frequently be in such a condition as to make it wise for the surgeon to simply make his flaps from the auricle and canal and suture these in position. The upper and lower angles of the incision may also be brought together with

silkworm-gut sutures. A gauze packing is then introduced through the posterior opening into the middle ear and allowed to remain there about three days. The case is then redressed, and is frequently found in a condition suitable for grafting at this time. Sometimes the grafting must be delayed until seven or eight days after the primary operation. When the grafting operation is done, the posterior wound is completely closed and the middle ear packed through the external auditory meatus. Where the post-aural abscess is not large, a good result may often be obtained by applying the grafts at the time of the primary operation and closing the posterior wound completely. In cases of acute mastoiditis following a chronic middle ear suppuration, in which no post-aural abscess is present, and in which it is decided to perform the radical operation at the time the patient comes under observation for the relief of the acute symptoms, it will ordinarily be possible to graft the bony cavity and close the posterior wound completely at the time of the operation. In some cases, however, there may be such extensive destruction of bone that the surgeon will prefer to wait, leaving the posterior wound open for a few days, doing the grafting operation and closure of the posterior wound at a period of from three to eight days after the primary operation.

In one case, operated upon a short time ago, there was very extensive bony destruction. The sinus was laid bare for a considerable distance. In this patient the wound was not in a condition to graft for about two weeks after the primary operation. During this time the posterior wound had narrowed considerably, and after inserting the grafts it was found impossible to bring the margins of the posterior incision together on account of the cicatricial contraction of the parts. The integument from the posterior surface of the auricle was therefore undermined and the adjacent skin over the mastoid, bordering the wound posteriorly, was treated in a similar manner. These sliding skin flaps were then brought together, thus closing the posterior wound completely. The patient made a perfect recovery.

The rule followed in this case, of allowing the parts to granulate for a considerable length of time, the posterior wound being left open, is probably the procedure which should

be followed in most instances where the dura is exposed over any considerable area, especially the dura covering the sinus. It seems hardly wise, especially in an acute case, where the sinus has been exposed and may later become thrombosed, to apply the grafts and close the posterior wound at the time of the primary operation. In cases of less extensive bony destruction, however, where the cranial cavity is not invaded, primary grafting and complete closure of the posterior wound should be the rule.

VI.

THE TREATMENT OF ABSCESS OF THE SEPTUM WITH SPECIAL REFERENCE TO THE PRE- VENTION OF SUBSEQUENT DEFORMITIES.*

BY C. G. COAKLEY, M. D.

NEW YORK.

The treatment of an abscess of the septum may be considered under two heads: First, the evacuation of the pus for the relief of the immediate symptoms, such as pain and nasal obstruction. Second, the prevention of subsequent deformities. These vary considerably and depend upon the destruction of part or a whole of the cartilaginous septum, the development of new connective tissue between the two layers of muco-perichondrium over the site of the cartilaginous septum and the sinking in of the soft parts over the tip of the nose, owing to lack of proper support.

On looking up the literature of abscess of the septum, as contained in the text books, written by American and foreign authors, the reader will find much valuable advice as to treatment under the first heading. The importance of an early evacuation of the pus is stated, and many valuable suggestions are given regarding the subject of drainage to prevent reaccumulation of pus. No writer gives explicit directions, which if followed will prevent or minimize the subsequent deformities.

It is hardly necessary to remind the Fellows of this Society that the cartilage of the septum receives its nutrition from the mucous membrane on either side of it, and that therefore this portion of the nasal mucous membrane acts as a perichondrium to the cartilage. It has surprised us to note how quickly the cartilage melts away and disappears when pus

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Association at Boston, February 14th, 1903.

is formed on each side of the septum between it and the mucous membrane. In one case a male aged 27, who was first seen six days after a blow on the nose, a bilateral swelling was found just within the vestibule of the nose and after evacuating about two drachms of pus, a perforation of the cartilage of the septum 3-4 of an inch in diameter was detected. In dispensary practice it is not unusual for a patient to present himself with an abscess of the septum anywhere from one to three weeks following the traumatism, and if the abscess is bilateral, there is always a large loss of the cartilaginous septum. If such cases are treated similarly to abscesses in other parts of the body, namely, by incision, evacuation of the pus, washing the cavity with an antiseptic solution and drainage, deformity in some degree will result. Tamponing the anterior part of the nasal cavities opposite the cartilaginous septum as advocated by some authors, and as formerly practiced by the writer, was frequently followed by considerable deformity. On studying these cases we noticed that the septum was unusually thick over the site of the abscess, due to a separation of the two layers of muco-perichondrium. The intervening space was filled in with connective tissue. This broadening of the septum interfered with the respiratory functions of the nose in one or both nasal cavities, and in time a greater or less depression or flattening of the exterior of the nose took place. Believing that this thickening and depression was due to the uneven pressure of the gauze packing, it occurred to me to employ the Simpson tampon to keep the two layers of muco-perichondrium in close juxtaposition during healing and at the same time to help bear the weight of the superimposed soft parts until the newly formed connective tissue was of sufficient density to support them unaided.

An incision is made into the abscess cavity on that side which seems the more soft or fluctuating. The incision is begun opposite the middle of the calumna, and as far anterior as possible. It is carried with one sweep down to the floor of the nose. The abscess cavity is irrigated with carbolic solution, 1-100, the head being inclined forward so that the fluid will come out of the anterior nares and not flow through the nasal cavity. Both nasal cavities are then sprayed with a 4 per cent.

solution of cocain, to which a few drops of adrenalin chloride, 1-1000, have been added.

After waiting five minutes, a cotton-wound applicator is passed into each nasal cavity, back of the posterior border of the abscess cavity, and together they are drawn forward making pressure against the septum, thus stripping the abscess cavity of any remaining secretion. The nasal cavities are next irrigated with Dobell's solution and a Simpson's tampon inserted into each naris. In the case of children, and in some adults, it may be necessary to trim the tampon to fit the nasal cavity. The tampon inserted into the side on which the incision was made should have its anterior end just posterior to the line of incision into the abscess. If a little antiseptic spray be injected into each naris the tampon will immediately swell and the operator may be sure that they will retain their place. A small piece of gauze may be inserted into the abscess cavity for 24 to 48 hours, if desired, but we have found that if the incision were a good, generous one, say from 3-4 of an inch to 1 inch in length, gauze drainage is unnecessary. Tampons must be removed every 24 hours and fresh ones inserted for about a week. The nasal cavity is sprayed with cocain and adrenalin each time and also irrigated with an antiseptic solution. At the end of a week some form of hollow nasal splint may be substituted for the Simpson tampons, for while wearing the tampon the patient must necessarily be a mouth breather. The splint which we have most frequently employed is the non-perforated Kyle splint, on account of the ease with which it can be moulded to the peculiarities of each case. It is advisable to wear the splints for three weeks, at the end of which the connective tissue will be well organized, the septum of normal thickness, and having a rigidity that very closely approximates that of the normal cartilaginous septum.

VII.

THE REMOVAL OF THE STAPES FOR THE RELIEF OF AUDITORY VERTIGO.

BY EUGENE A. CROCKETT, M. D.

BOSTON, MASS.

In considering the etiology of auditory vertigo, it is evident that a lack of mobility of the base plate of the stapes or of the membrane of the round window must be a primary cause in many cases. Such lack of mobility may be from primary fixation of the stapes, or from the membrana tympani or ossicular chain being rigid, and thus preventing a free motion of the base plate in the oval window. In the second class of cases, it would seem that relief of the symptoms under consideration should be obtained by some one of the simpler middle ear operations such as removal of the membrane, malleus and incus (Kessel's or Sexton's method), or removal of the incus alone in the manner so enthusiastically advocated by Burnett. Certainly in some instances marked relief may be obtained by the simple cutting of the intratympanic adhesions or mobilization of the stapes. Where, however, the lesion is primarily about the stapes base plate, no operative measure short of the actual removal of the ossicle will be of any avail, and a consideration of the pathology of this form of ear disease will show us the impossibility of removal of the base plate in advanced cases, owing to the firm cartilaginous or osseous adhesions between the stapes and the edge of the fenestra ovalis.

A considerable experience in middle ear operations has led the writer to advise such a procedure only as a last resort, and the present operation is advocated only in the severe form of auditory vertigo, and then only when the ordinary treatment has proved futile.

A certain amount of information may be obtained from the consideration of the case history and appearances of each

individual case, and particularly on a careful hearing test. For instance, cases showing marked thickening of the membrane, marked retraction of the malleus with prominence of the posterior fold, or cases where on inspection adhesions can be seen in the tympanum, are more likely to get relief by a simple operation (such as Kessel's) or by the simple cutting of the intratympanic adhesions. Cases where the membrane is normal in appearance and the hearing test shows the trouble to be localized about the base plate of the stapes will, in my opinion, not be benefited by any kind of operation except the removal of the stapes and this will be particularly difficult as will be at once seen by a consideration of their pathology. Where, in such cases, a low tone deafness does not rise above middle C in the musical scale and where there is no high toned deafness or where the upper tone limit is not below 20,000 vibrations a second, the operation of stapedectomy may be undertaken with a fair chance of removing the entire ossicle. Where the upper tone limit is below 20,000 vibrations or the lower limit is above 512 vibrations, the chances are that the ankylosis of the ossicle is so complete that the attempt at its removal will be followed by rupture of the crura at their junction with the base plate and, of course, in such cases no benefit will result.

In such individuals as those whose histories are detailed later, any line of treatment which offers any hope of relief is justifiable provided the different possibilities are carefully explained to the patient in advance.

D.; 45 years old; first seen in March, 1894. Well developed man; conducting a large business and under a considerable mental strain; uses alcohol and tobacco moderately; has had gout severely in the past but not for about two years; has noticed an increasing deafness about two months; no tinnitus. Has recently been under a severe mental strain and has been very nervous with some insomnia. In the last month his hearing has grown rapidly worse in the right ear and he has had slight vertigo nearly every day. His urine has been recently examined and shows nothing abnormal beyond a high specific gravity and acidity from concentration. At the first examination both membrana tympani were found thickened and non-transparent and showed scars

from suppurative disease in childhood. His hearing was diminished for the watch and voice in both ears but especially in the right, but the upper and lower tone limits were not affected. The test showed no internal ear affection. On the day before the examination he had been seized, while sitting in his office, with an apoplectiform attack of vertigo and fell out of the chair on the floor. The nausea and vomiting in this attack lasted about two hours. Middle ear treatment with the Eustachian catheter and Politzer inflation was begun at this time and continued a year; tympanic massage with a Siegle speculum was also used for a time, as well as general tonic treatment. Acting under the impression that business strain might have something to do with the symptoms of vertigo, two long vacations were taken. The patient was also dieted, so that he was reduced 20 pounds in weight, and his general condition was undoubtedly much improved. Under this constant treatment his hearing improved slightly but he had over twenty attacks of vertigo, nausea and vomiting in a year, some of which were of the severe apoplectiform type. An examination of his eyes showed nothing abnormal beyond a slight hypermetropic astigmatism, correction of which made no improvement in his condition. In the fall of 1895, a middle ear operation was advised and under cocain anesthesia an incision was made in the posterior portion of the right membrane tympani and a hook passed between the crura of the stapes. This ossicle was found freely movable, and its removal was therefore deemed advisable. The incudo-stapedial articulation was cut and the incus removed with a snare. Instantly the patient exclaimed that he was deaf in the right ear, and an examination showed a total loss of aerial hearing in the ear for watch, voice and tuning forks. A sensation as if a band were drawn around the occipital region from ear to ear, which had existed since his first vertiginous attack, was gone and there was no vertigo for over six months, at the end of which time the attacks began again, so in the spring of 1896 the stapes was removed under ether anesthesia. The ossicle was apparently freely movable and came out with great ease. Following this last operation, the patient had a few slight attacks

of vertigo for about two months, since which time he has been perfectly free from any trouble of the kind.

May 17, 1901. G. W. S.; 41. Three years ago patient had an attack of vomiting lasting for about 15 minutes, preceded by an attack of vertigo, during which objects would seem to ascend. These attacks became frequent; intervals of one month to two or three weeks occurring between; each attack preceded by vertigo. Sometimes objects would descend and other objects "go round." Patient would feel badly for four or five days after. Vomiting would last four or five hours. At times when patient would whistle above certain notes he would hear double—a lower note than that whistled and in accord. This has not occurred within past two months. Also when hearing music which previously would appear natural, recently the higher notes would seem discordant. He has had some pain in the head before attacks also, otherwise seems well. Just before the operation, the patient's vertigo became practically continuous and the vomiting so severe as to render it impossible for him to continue with his business. Ordinary treatment of the middle ear had given no relief. Examination:—A. s. m. t. somewhat dull in lustre and retracted moderately. Canal normal.

May 18, operation, ether, half hour.

After application of adrenalin 1-5000, a triangular flap was removed from posterior segment of membrana tympani. Incudo-stapedial joint cut through and attempts made to remove incus. This was impossible as incus retracted upward and backward and out of sight. Stapes not visible on account of adhesions. Adhesions cut and hook passed between crura of stapes by feeling; bone was drawn down into view but as the stapedius tendon had not been cut, the stapes was pulled upward and backward into mastoid antrum; some perilymph escaped from the fenestra ovalis. Canal filled with sterile cotton and sealed with collodion. Recovery from ether slow and patient very much nauseated, the nausea lasting until midnight.

May 19th. Patient very dizzy unless he lies perfectly

quiet. No vomiting this A. M. Takes liquid nourishment in fair amount.

May 20th. Dizziness less marked but patient unable to sit up. Cotton in canal is soaked with serum and blood and renewed. No odor. Temperature normal.

Potassium bromide gr. x given t. i. d.

May 21st. Patient can sit up but sudden motion brings on dizziness.

May 24th. Slight serous discharge from tympanum. Ear wiped dry and powdered with boric acid. No pain in ear.

May 27th. Ear still has a very slight serous discharge. No dizziness.

May 31st. About one cotton stick saturated with discharge in 24 hours. Perforation in posterior segment with slightly edematous edges persists. No dizziness.

May 31st. Discharged improved.

Bezold forks show:

Hearing, Right ear Low D 1 = 36 d. v.

Right ear, High Normal.

Left ear, Low e² whistle.

Left ear, High Galton 5,4.

Bone conduction always referred to right ear.

Forks not heard by air conduction.

Whistle heard from e to 5.4 Galton.

Weber referred to right ear.

Three weeks after the operation the patient resumed work and until January, 1903, had absolutely no vertigo. In this month a slight dizziness was produced by an acute serous catarrh of the unaffected ear which disappeared after the catheterization of the Eustachian tube.

In addition to these two cases, I have operated on two others with similar case histories, in one of whom the lower tone limit was 2048 and the other 1024. In both of these cases, the vertigo was so severe that anything seemed justifiable. In both, the incus was removed with ease but the stapes could not be removed owing to its firm fixation. Neither case sustained any improvement from the operation.

Just a few words as to the technique of the operation. In all cases, a flap is made of practically the whole posterior quadrant of the membrana, putting the knife in behind the

umbo and carrying it upward close to the posterior edge of the malleus, then across posteriorly and down the posterior superior wall. This flap is then turned downward. The incudo-stapedial articulation is then cut and, whenever possible, from behind forward. The long process of the incus is then seized with a Sexton forceps and the ossicle removed by traction. The stapedius tendon is then cut and a blunt-pointed hook passed between the crura and the stapes and the stapes removed by traction a little upward and outward.

I have done the operation a number of times without any anesthesia but it is exceedingly painful to the patient and in most cases general anesthesia is advisable.

Curiously enough it will be observed that in both the cases I have reported, a complete and total deafness resulted from the operation. There was also an increase of tinnitus. I believe the lesion in this case to be a hemorrhage into the internal ear. In something over thirty stapes operations which I have done, this is a rare complication, certainly occurring in not over 5 or 6 out of 30 cases.

I present this paper with some hesitancy because I have not definitely made up my mind in just what cases the operation should be advised, but certainly in both these which I have reported, there can be no doubt of the wisdom of any procedure which offers relief.

In both instances it was carefully explained to the patient that the operation might completely ruin the hearing in the affected ear. In fact, I should always do this before removing the stapes at all.

Both patients had been unable to carry on their business, one for 6 months and the other for over a year and both have been completely relieved; the one for nearly 7 years, the other for 2. Both are in active business at the present time.

It will be observed that in the first of these two cases and also in the two unsuccessful cases which I have reported that Burnett's operation of removal of the incus alone was done and failed to give the patient any relief whatever. The contrast between the two cases where I was unable to remove the stapes and the two reported with successful removal, was very striking in this respect.

VIII.

ABRIEF CONSIDERATION OF PROGNOSIS IN CHRONIC SUPPURATIVE OTITIS, BASED ON THE RESULTS OF A YEAR'S TREATMENT OF SUCH CASES.

BY THOMAS J. HARRIS, M. D.

NEW YORK.

In spite of the many articles and discussions, the last word is yet to be spoken on "chronic suppurative disease" of the middle ear. Indeed to-day, because of the increased activity along the lines of treatment, the subject is of especial interest. No one can hope to do more out of the limited experience than to add a mite to the accumulated experiences of others and yet the question is so vital a one (for it concerns nothing less than life itself) that a clear and authoritative opinion is pressingly demanded on this question. "What is the future as regards the cure for the patient suffering from chronic discharge from the ear?" "What chance has he for the relief of his symptoms along conservative lines of treatment?" "What risk is he running, of sooner or later suffering from fatal complications?" These are the questions which every thoughtful aurist is continually asking and being asked. If the risk is so imminent for a fatal termination in every case, or in the great majority of cases in chronic otorrhea, a grave responsibility is placed upon the physician to advise an operation.

The writer recently, for a period of eighteen months, has had under his care at the Manhattan Eye and Ear Hospital, all the suppurative cases in the service of Dr. Wendell C. Phillips.

With a view to testing the value of treatment, each case has been carefully studied and the results of the treatment, as far as possible, accurately noted.

It is not forgotten how misleading the most painstaking of statistics may be and more than once it has been asserted

that many aural statistics have been made to order. This is emphatically denied in this case. The condition of the patient was carefully noted at the time of his first visit, by the examiner, Dr. Phillips, and improvement or otherwise during the course of treatment recorded, and the result at its completion. To render the results still more accurate, the condition of the patient's ear was at an interval of a year inquired into, postal cards being sent to all the cases to report at the clinic. These later records were in each case made by my assistant, the patients not being seen by me. Of over one hundred cases which came under my care, only some fifty odd were faithful in their attendance at the hospital, and thus permitted study and investigation. All surgical measures indicated, such as removal of adenoids, extraction of polyps and granulation tissue, were at first performed.

This done, it was sought to discover, irrespective of any necrosis of the ossicles, what result can be accomplished by medicinal treatment alone. In most cases the patients were seen every second or third day. On the whole, they were superior in intelligence to the usual hospital patient, and directions were generally properly carried out. In all instances an otorrhea had existed for many months and in most cases for years, with certain exceptions to be noted. Different methods of treatment were employed, including the so-called "dry treatment," in a limited number of cases.

The total number of cases treated, including a few private cases of which notes were available, was sixty-six. Of these, forty were discharged at the end of from one to six months of treatment entirely cured, fifteen greatly improved; eleven showed no improvement at all. Of the forty cases reported cured, five were cases of acute exacerbation of a former condition, and on account of partaking of the character of a simple acute attack, are not included in the total number of cases reported cured. Of the thirty-five cures, subsequent examinations at the end of a year's interval in twenty were made, showing relapse in two instances. Of the eleven cases not improved, representing 12 per cent., the radical operation had been advised and refused in four. In one an ossiculectomy had been performed some time previous to the beginning of the treatment, and in another the radical oper-

ation was performed with benefit, but without cure. It will thus be seen, that in the 55 or over 88 per cent., including the acute exacerbation, improvement or a cure was secured, and that in twenty, or over 50 per cent., of the cases reported cured, later reports show relapse in only two.

The following was the therapy employed in the cured and relieved cases.

Hydrogen dioxide.....	20
Formalin.....	9
Borolyptol.....	3
Camphoroxol.....	5
Menthoxol.....	1
Protargol	1
Boric Acid in alcohol (saturated solution).....	6

We employed in the topical treatment of chronic otorrhea, either the method by irrigation or the so-called "dry method." Without question the latter is the ideal method. Experience, however, teaches us that it is impracticable to use it in the hospital clinic, and the combination of the two has served us best. Usually a slip containing printed instructions is given the patient, specifying the steps of home treatment and thus avoiding mistakes. In some cases an antiseptic solution was only given. Formerly boiled water was ordered, but later a weak formalin solution, "10 to 20 drops of the 40 per cent., to the quart of hot water," has been substituted and, as Lucae has shown, proved much more satisfactory. In a few cases, 1-5000 bichloride solution was employed but did not work as well. This syringing was however usually preceded by the use of hydrogen dioxide in full strength. This was the routine method of treatment, and as will be shown in the cases reported, worked most satisfactorily. Indeed our use of this drug here and in many other cases for the past ten years convinces us that it is the most valuable single remedy that we can employ. The single objection to its use is the danger of its injuring the pneumatic cells and thus forcing inflammatory products before it. To our minds this is more of a theoretical than a real objection. It should be avoided however in cases of small perforations of the ear drum. In an extensive use of this antiseptic, we fail to recall a single case where un-

pleasant results have followed and where, subsequent to treatment, sagging of the superior wall with some mastoid tenderness took place. No subsequent note of the case was made, but as far as we know no further discomfort followed. In six cases, camphoroxol and menthoxol were substituted. These are the synthetic products of peroxide, camphor and menthol. They must usually be employed in dilution, 25 to 50 per cent. otherwise they cause pain.

We fail to see that they have any advantage over the plain peroxide. The treatment was concluded by a thorough dry cleansing with cotton on a match or tooth pick. This was repeated two to three times a day according to the condition of the ear. In cases where the secretion was scant and the patient showed a sufficient degree of intelligence, a dry treatment was employed, followed by the use of a saturated solution of boracic acid in alcohol, to which was added as suggested by Dr. J. F. McKernon, a small quantity of 1 to 1000 solution of bichloride. As an astringent where scant granulation tissue is present, this formula was by far the most efficient of anything employed. Where a greater amount of granulation tissue existed, in addition to curetting, chromic acid, protargol and nitrate of silver were the drugs employed. The value of the local treatment to the ear was greatly enhanced by proper attention to the nose and nasopharynx. Indeed most cases of fresh attack proceed from this region. In children a course of codliver oil and iron is almost always indicated. This plan of treatment has, as has been shown, given a very excellent result in a large number of our cases.

How long was the treatment usually continued and how long should it be persisted in? We are of the opinion that the ordinary minimum of time of two to three weeks, given as the period when, if improvement is not pronounced, operative measures should be employed, is altogether too short. In many cases we will need to persist for weeks and even months to effect a complete cure. It is equally true that an indefinite course of treatment in most cases is to be condemned. Cases are seen coming to our hospitals for years without any beneficial results. This is all wrong. The average duration of time of the treatment in the cases reported

was from two to three months. What if the discharge is not controlled in a reasonable time? Here we touch the most debatable question of the hour to the aurist.

Many cases at the first examination, on account of the pronounced necrosis of the ossicles, warrant the most dubious prognosis only, with local treatment, and the briefest course of such treatment should be employed; the value of ossiculectomy in such cases is not open to question. The operation as far as severity is concerned, is beyond objection. Where the ossicles are gone in whole or in the greater part the question is a different one. Shall we advise the so called radical operation? The writer is aware how enthusiastic many of his colleagues are at present on this measure. He does not forget their strong argument of the eminent risk to life in an uncured otorrhea. It is undoubtedly true that the disease in many instances has extended woefully near fatal structures, yea that death itself has resulted. But is the risk as great as portrayed? We feel amid all the brilliant work in aural surgery a conservative note should be struck. The protecting care of nature in such a case is too apt to be lost sight of. It is our opinion that in many cases this natural wall of protection will prove amply sufficient. It is not to be denied for a moment that we meet cases where this complete operation is properly indicated, but we feel it is gravely open to doubt whether a slight uncured otorrhea without other symptoms is sufficient to demand it.

The recent statistics of Schwartz's clinic show that in some one hundred radical operations the hearing was rendered worse in over 33 per cent. This deserves sober reflection. It is a simple matter to advise such an operation and perform it in the hands of a skilled operator without risk to life, but let us not forget what it means to the patient. The man probably has impaired hearing already. The loss of hearing means to him the loss of occupation, not to speak of virtual exile from his fellow men. And the result of such loss of occupation is often more serious than the loss of life itself. Of the wisdom of conservatism, Miss R., one of the cases reported, is an illustration. A long standing otorrhea developed an acute attack with mastoiditis. The question whether the operation should be performed was carefully

considered. The young lady was a school teacher with all the hearing lost in the well ear. A simple mastoid operation was finally decided upon. To-day the patient is entirely well, all the otorrhea has ceased and the hearing remains unimpaired.

Nor is the patient entirely free from risk of danger to life. In the hands of two expert operators, two cases known to the writer have resulted fatally during the past year. Further in addition to the time lost from work, which in not a few instances is considerable, a complete cessation of the discharge is not always certain.

One of the 11 cases reported as not improved is an illustration of this. After a most thorough operation there is still at the end of six months, some discharge from the ear. It is instructive in this connection to refer to the opinion of some of the leaders of otology abroad. At the Sixth International Otological Congress held three years ago in London, this subject was under discussion. While Macewen among others took extreme grounds upon this question of when to operate, Politzer the nestor of the profession, expressed himself as follows; although he was a strong advocate of the radical operation in suitable cases, he could not agree with those surgeons who performed it often for the mere purpose of stopping the discharge, at least not until strenuous efforts had been made to stop it by other means. He thought in these cases it was not justifiable to have recourse to an operation which, although not dangerous in the hands of a skilled operator, was still a serious one, especially when they considered; 1, the many important structures in the vicinity, which might be injured; 2, the possible permanent impairing of hearing in those who before the operation could hear fairly well; 3, the protracted healing after the operations which very often renders patients hors du combat for many months.

Dr. McBride, of Edinburgh, agreed with Politzer, Lucae and Guye in their conservative method with regard to mastoid operations. Gradenigo said, "For the purpose of healing simple pathologic conditions of the tympanic cavity, the extraction of the ossicles or even of the hammer only, and removal through the exterior auditory meatus of the pos-

terior superior bony wall, were for the most part proven sufficient." In such cases the retroauricular method did not give better results. At this meeting Kuemmel, of Breslau, referred to a class of cases of which the writer has had an illustration, viz., hysterical girls. They are able to imitate any kind of symptoms. One case he operated on for the fifth time and never found anything. The skull had been trephined over and over until there was a defect the size of the palm of the hand. Still every six months she became ill with the same symptoms; she reproduced all the appearances of dizziness; she showed facial paralysis, she had a temperature of 104 1/2 F. This girl is quite well now with over 20 punctures of the brain and 7 narcoses.

The case in our own practice has been presented to the otologic section of the New York Academy of Medicine. There had been an old suppurative process with loss of mt. and ossicles, which was healed. A mastoid operation was performed for continued mastoid pain and tenderness with negative findings. The pain returned after six months over the supramastoid region. It was periodical only, nothing was seen in the ear though the probe detected rough bone. There was an elevation of temperature of one degree. In the discussion of the case, a radical operation including exploration of the brain was advised by several prominent members of the section. Under the care of the hospital neurologist, the case fully recovered; it was diagnosticated by him as a neurotic condition. The statement of one writer already quoted (Richards) is most decidedly open to question. He says, "The question of the influence of operative measures upon the hearing power is not very much of a factor in these cases, since the danger to the individual is more to be considered than any possible influence which the operation may have upon the hearing power. It is usually benefited by an operative procedure, since material which is a hindrance to the passage of the sound wave is removed by the operation, but may now and then be diminished."

From the first of these assertions we must decidedly dissent. As we have said before, the loss of hearing is a most serious matter. To a man dependent on his own exertion it may mean even existence itself. To every one it means vir-

tual exile and misery, worse than loss of life. This is further borne out by the reports of results in the hands of the leading operators, according to this method. Thus Stacke had in 37 cases, 27 cures; Panse in 57 cases, 31 cures; Grunert in 43 cases, had 24 cures. In Panse and Grunert's cases this meant only 54 and 52 per cent. respectively. These certainly are not the most encouraging of statistics. Nor can we with any just degree of confidence offer our patient, who trustingly puts himself in our hands, an all but positive assurance of a cure. Let us not forget that such a cure may extend not over 10 days of hospital treatment as in the favorable cases, but for weeks and months.

Complications of an annoying is not dangerous character may occur from the operation. Facial paralyses are becoming alarmingly frequent. While it is true that for the most part they may clear up, they are not less disagreeable, and especially so because occasionally they do persist for months and even permanently. Nor is our chief hope of a lasting cure always realized. This seemingly entirely healed cavity will occasionally take an infection through the Eustachian tube or otherwise. We would be sorry to be misunderstood. We most freely admit that indications arise every day, such as intracranial complications, where there can be no question of the need of such operations. It is the dictum recently put forth and acted upon, that chronic or intractable otorrhea, per se, without other symptoms, is an indication for radical operation, that we may venture to question. Such a view is expressed by one writer in the words, "Every case of suppurative otitis media is a slumbering volcano or a charge of dynamite liable to explode at any time." Yet this writer quotes statistics to show that in 9000 autopsies at Guy's hospital, only 2-3 of 1 per cent. died of intracranial complications, while Gruber in 4000 autopsies found only $\frac{1}{2}$ of 1 per cent., and Koerner, an authority on cerebral lesions, following aural diseases, saw only two cases in 2207 ear cases. As to the statement that such loss of hearing rarely occurs, the figures from Panse and Grunert just cited, have only to be borne in mind.

Finally, to show that after all we have not been speaking too pessimistically, we would like to quote from one who has

had a very large operative experience and who has never been accused of over-conservatism. Dench, in his recent paper read in Washington before this society says: "My own experience with the radical operation leads me to believe that the surgeon is not warranted in promising the patient that the hearing will be as good after the operation as it was before, unless at the time of operation the power of audition is very greatly diminished in the affected ear. While during the course of the operation the surgeon may not injure any of the delicate structures within the tympanum, in those cases where the mobility of the stapes approaches anything like the normal standard, a certain rigidity of the ossicles must necessarily take place as the result of the epidermization of the tympanic cavity. In cases where the audition is good, the possible effect upon the hearing, other things being equal, will cause the surgeon to choose the simple operation of ossiculectomy rather than the more radical procedures." The author's own statistics and words show that the results of the two methods, viz., the simple and radical, vary very little as regards the cure of the discharge. We quote, "In these cases reported by Panse we find as the result of the radical operation, 54 per cent. of cures, while Grunert reports 52 per cent."

Referring again to the statistics of the simpler operation it will be remembered that of Grunert's cases, 46 per cent. were cured; in Ludwig's cases, 51 per cent.; and Schroeder's cases, 48 per cent. It will be seen therefore that with a few exceptions, the percentage of the cures is not so much greater for the radical operation than it is for the more simpler procedure. Such being the situation for actual results, consider for a moment the difference as concerns hearing. Dench says, "In my experience the result of ossiculectomy has seldom been to reduce the hearing but has in many cases materially improved the power of audition. Conducted carefully the surgeon can practically promise the patient that barring accident, the hearing after the removal of the ossicles will be no worse than it was before and will probably be some improved. In 130 ossiculectomy cases reported by Schroeder, hearing was improved in 65 per cent., 22 per cent. remained

the same, in 13 per cent. only was it impaired. Ludvig's 43 cases showed impaired hearing in only three, improved in seventeen, unchanged in nineteen, unknown in two.

We think we have said enough to show that a conservative view on so grave a subject is not without just grounds. No stronger testimony is needed than the author just quoted. It is too often lost sight of that it is or should be the surgeons greatest pride to say as Lucae says, "Not that I have operated on so many patients, but that I have cured so many patients without operation." We venture in conclusion the following deductions:

1. Chronic otorrhea in a large percentage of cases is amenable to suitable medical treatment.

2. In addition to proper attention of a general character and to the naso-pharynx, peroxide of hydrogen with or without formalin solution, gives the best results, all minor operative procedures of course first being attended to when necessary.

3. The results of such treatment are in a good number of cases permanent.

4. The risk of an uncured otorrhea with good drainage is relatively very small ($1/2$ or $2/3$ of fatalities).

5. Medical treatment failing, after a suitable interval of time, the danger of fatal complications in absence of all symptoms should be laid before the patient and the promise of relief by operation stated.

6. Where there is no good reason to the contrary such as intracranial or mastoid complications, the intratympanic method by ossiculectomy should be preferred.

- (a) Because its results as regards the cure are equally good.

- (b) The risk to loss of hearing is vastly less.

- (c) The danger of unpleasant sequelae, such as facial palsy is avoided.

- (d) The possibility of prolonged after treatment is obviated.

7. The radical operation is not without risk to life.

8. Where ossiculectomy fails or mastoid or other symptoms exist pointing to extension of the disease into the bone, the radical operation then becomes the suitable and valuable method of relief.

9. The protecting and assisting power of nature is never to be lost sight of.

IX.

OTOSCLEROSIS OR SPONGIFYING OF THE CAPSULE OF THE LABYRINTH.*

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Before the tuning-fork tests were introduced as an aid in diagnosing labyrinthine from middle ear deafness, cases presenting the clinical picture of gradually increasing deafness which ran their course without any catarrh of the middle ear and in which the physical examination revealed none of the well-known marks of catarrhal inflammation of the middle ear, were diagnosed as primary disease of the labyrinth, "nerve deafness."

With the aid afforded by the tuning-fork tests, these cases were divided into two distinct groups. The first group included those cases where a shortened bone conduction and a positive Rinné showed defect in the sound-perceiving apparatus, cases of labyrinthine deafness. The second group included the cases where a prolonged bone conduction together with a negative Rinné and a marked degree of deafness for tones at the lower end of the scale showed an obstruction in the sound-conducting apparatus, cases of middle ear deafness.

These latter cases, although the Eustachian tube was normal and the membrana tympani showed none of the marks of middle ear catarrh, were classified as the sclerotic type of the dry chronic middle ear catarrh in distinction from the hypertrophic type where a more or less contracted tube together

* Read before the Chicago Laryngological and Climatological Association, Feb. 23, 1903.

with a retracted and thickened membrana tympani gave positive evidence of inflammatory changes in the middle ear.

These cases of so-called sclerosis of the middle-ear, it has long been known, do not improve under treatment, but in spite of all treatment, as a rule grow worse and worse, often terminating in total deafness.

Post-mortem examinations of cases diagnosed as sclerosis made by Politzer, Bezold, Siebenmann and others, have revealed the fact that the pathology of this condition consists in the development in the bony capsule of the labyrinth of nodules of spongy bone replacing the previously existing ivory-like bone of the capsule.

The clinical picture usually presented by these cases of obstruction in the sound-conducting apparatus, namely prolongation of bone conduction with markedly negative Rinné and a marked degree of deafness by air conduction for the lower tones, is explained by the fact that the newly formed bone nodules usually develop about the fenestra vestibuli, producing quite early in the disease a bony ankylosis of the stapes and the typical symptoms of obstruction in the conducting apparatus. As the disease progressed, however, and the structures of the cochlea became more and more involved, symptoms of beginning labyrinthine deafness were often superimposed on those of the middle ear type.

A physical sign often seen early in these cases, a sign first noted by Schwartze, is a reddish lustre transmitted to the membrana tympani from a congestion of the blood vessels on the inner wall of the cavum tympani. This sign is of positive value only when it is present, when it signifies that the condition is progressing. Its absence is of no value in diagnosis, since the congestion disappears entirely in the later stages of the disease.

Siebenmann was the first to report a case with post-mortem findings of multiple areas of spongyfying bone in the labyrinthine capsule and where the functional tests showed deafness of the labyrinthine type instead of obstruction in the conducting apparatus as usually found.

The diagnosis of this condition in a typical case can be made with certainty. If in a case with gradually increasing deafness, the membrana tympani is found normal or with the

reddish lustre transmitted from the wall of the promontory and the Eustachian tube is open, while the tuning-fork tests show loss of perception for the low tones, a decidedly negative Rinné, and prolongation of bone conduction, the diagnosis of sclerosis is positive. When, however, this condition develops in a case previously the seat of some middle ear trouble, either catarrhal or suppurative, or when the condition takes an atypical course, as in the case referred to above, producing labyrinthine deafness, the diagnosis in most instances must remain in doubt.

Various terms from time to time have been applied to this condition based on the existing conception of its pathology. The term sclerosis of the middle ear was the term first used to distinguish this condition from the hypertrophic form of chronic catarrhal otitis media. The term was based on a misconception of the pathology of the condition, since later investigation has demonstrated the absence in this disease of a sclerotic process in the middle ear. Anchylosis of the stapes is another term that has been used and while it expresses clearly the pathological condition that produces the prominent clinical symptoms of an obstruction in the conducting apparatus often presented in these cases, it is not an entirely satisfactory term. In the first place, other pathological processes besides spongifying of the labyrinthine capsule may produce fixation of the stapes in the fenestra vestibuli, and in the second place, this condition of spongifying of the labyrinthine capsule may develop, as Siebenmann has found, in various parts of the capsule and produce as the prominent symptoms those of labyrinthine deafness instead of the symptoms of primary fixation of the stapes. Politzer has used the term *capsulitis labyrinthi* and Siebenmann that of *spongifying of the labyrinthine capsule*. In a recent number of the *Annals of Otology, Rhinology and Laryngology* is an article on this subject referring to the process as *otitis media insidiosa*. The process is not an *otitis media* at all, but a disease of the bony capsule of the labyrinth which through its early fixation of the stapes often produces the clinical picture of obstruction in the sound conducting apparatus.

I have here to present a case showing the typical picture of labyrinthine deafness but where the probable diagnosis of

disease of the capsule of the labyrinth without fixation of the foot-plate of the stapes has been made as the condition that will best explain all of the symptoms presented.

The history of the case is as follows: Mr. T., aged 27, a university student in good general health. He has had no serious illness and has never had syphilis. He knows of no deafness in any member of his family; nor has he had any ear trouble previous to the present one.

About three and one-half years ago tinnitus began to develop insidiously in the right ear. At first it was noticed only on waking in the morning, when everything was quiet. In the course of several months the tinnitus was noticed also during the day. It was associated after a short time with slight deafness and a sensation of fullness in the ear as though the ear was stopped up. About six months after the involvement of the right ear, the same symptoms began to appear in the left ear. The tinnitus is continuous in both ears and in the right ear is pulsating in character. He likens the tinnitus to the roar produced by the wind in a forest. The deafness has been gradually increasing and he says it has progressed much more rapidly during the past six months. These are the only symptoms present. There has been no dizziness or vertigo.

A physical examination found the nose and nasopharynx normal, the Eustachian tube normal and patent. The membrana tympani had a perfectly normal appearance, showing not a trace of retraction or thickening. Cone of light normal. Spread over the entire membrane was a diffuse reddish lustre, transmitted from the wall of the promontory.

Functional examination gave the following results: Whispered voice could be heard in the right ear only when spoken with force and close to the meatus; in the left ear it could be heard at a distance of six inches from the meatus. In the Weber test the fork was lateralized distinctly in the left or better hearing ear. The Schwabach test showed a marked shortening of the bone conduction. The Rinne test was positive for both ears. The C fork (64 d.v.) was heard in both ears almost as long as in a normal ear, while the c⁴ fork was shortened about 45 seconds. The functional tests gave the usual results of a typical case of labyrinthine deafness.

The age of the patient, the normal condition of his general health and the absence of any constitutional disease that might produce disease of the labyrinth, the absence, moreover, of any known cause for primary disease of the labyrinth, such as syphilis, occupation, injury, etc., the absence, too, of the characteristic symptoms of Menière's disease, these together with the insidious development of the symptoms of tinnitus and deafness of the labyrinthine type, led me to suspect the possibility of a primary disease of the bony capsule of the labyrinth in which the spongifying process, however, did not cause primary fixation of the stapes but had developed in the lower end of the basal coil of the cochlea, producing the typical symptoms of labyrinthine deafness. This diagnosis was made all the more probable from the result of the physical examination, which, in the absence of any sign of catarrh of the middle ear, revealed on the membrana tympani the typical reddish lustre transmitted from the wall of the promontory, characteristic of otosclerosis.

To pronounce this case positively one of spongifying of the labyrinthine capsule may hardly seem justifiable, considering the very limited knowledge we have regarding the possible clinical course and the possible symptoms that may be produced by this process, especially when it develops in parts of the capsule not in the region of the fenestra vestibuli, as in the case of Siebenmann referred to above. From this case it has been shown that the spongifying process may develop in various parts of the labyrinthine capsule, and, instead of producing the usual symptoms of ankylosis of the stapes, it can produce the symptoms of labyrinthine deafness.

In the case reported here the clinical history together with the physical findings, for reasons stated above, would seem to justify the diagnosis of otosclerosis or spongifying of the labyrinthine capsule involving the basal coil of the cochlea, and without producing ankylosis of the stapes.

X.

ANGIOMA OF NASAL SEPTUM.*

BY IRVING E. KIMBALL, M. D.

PORTLAND, MAINE.

J. P. R., a clergyman, 56 years of age, presented himself to me with the following history. For a few years preceding he had been troubled with nasal obstruction, a slight discharge, yellowish in color and rather thick in consistency. He had consulted a physician who told him he had chronic nasal catarrh and who prescribed for him a nasal spray. About one year from this time he began to have troublesome hemorrhages from both nostrils. These increased in intensity to such a degree that he was advised to see a specialist. He unfortunately drifted into the hands of one of newspaper notoriety who told him that he had ulceration of the septum and that he must submit to a course of treatment which as he said consisted of sprays and blood medicines. The hemorrhages continuing to grow worse and his general health beginning to suffer so much as to interfere with his preaching he decided to consult some one else and presented himself to me for examination and treatment. The patient presented a sorry picture, inability to breathe through either nostril, almost daily hemorrhages, markedly anemic in appearance, exceedingly nervous, inability to concentrate his thoughts on his work, and a determination to give up preaching. On examination I found a large sized bilobular growth, pedunculated, hanging from the right nasal cavity, situated not far from a point opposite the inferior turbinated bone, on the septum, bleeding quite freely at the slightest touch and pulsation easily made out by simple inspection. In the

*Read at meeting of Eastern Section of the American Laryngological Rhinological and Otological Society held in Boston, Feb. 14, 1903.

left nostril slightly lower down on the septum was a sessile single lobed growth in which no pulsation could be made out which also bled at the least amount of probing. In my examination I started up so much of a hemorrhage that I hesitated about operating that day. I told my patient that he had bleeding tumors which I thought ought to be removed at once and that their removal might prove very troublesome to us both. The following day I operated with a cold snare on the right side, the time consumed being an hour and three quarters in its removal. I had no sooner removed the growth when a most alarming hemorrhage ensued which for some time baffled my efforts for its control. I actually thought my patient might bleed to death at that time, however, after what seemed hours to me I did get it under control sufficiently to thoroughly cauterize the surface with a galvano-cautery. The patient had no trouble from this time on and at the end of ten days came in for the removal of the growth from the left side. Here I transfixed the tumor with a transfixing needle and passing a wire over that succeeded in removing this. I got a moderate amount of hemorrhage in this case and used chromic acid quite freely to the base. I saw the patient several times within the year following the removal of these tumors and there had been no recurrence. Since then I have lost trace of the patient as he has gone to the West to reside. An examination was made of both growths with the following report: Both tumors were composed of blood vessels, held together by connective tissue, some of the vessels being lined with epithelium; both round and spindle shaped cells were found in the connective tissue. Blood spaces were abundant. Undoubtedly angioma.

Authorities seem to differ somewhat as to the frequency of these growths. Dr. F. C. Cobb in his report of a case in the Boston Medical and Surgical Journal of November 23, 1893, speaks of the rarity of these cases. In his research after cases he could obtain but 19 in all and some of these were of doubtful diagnosis. He furthermore says that out of 7429 cases examined at the Massachusetts General Hospital, his was the only reported. Dr. Kyle in his work on Diseases of Nose and Throat says, "Angioma of the nasal passages is of rare occurrence. There is no doubt that these growths are

more often found on the septum than on the turbinal bodies." Dr. Jonathan Wright in his recent work says, "These tumors are not so rare as has been represented," and refers to reports of cases from German and American literature, about thirty in all.

I know of no other instance in which angioma has been found in both nasal cavities and this fact in my case is largely the reason for my reporting it to this Society.

XI.
THE ETIOLOGY, PATHOLOGY AND SYMPTOMATOLOGY OF ACUTE SUPPURATION OF THE MIDDLE - EAR.*

BY EDWARD BRADFORD DENCH, M. D.

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An acute middle-ear suppuration is invariably caused by the introduction of some pathogenic germ into the tympanic cavity. This germ gains entrance either through the external auditory meatus, there being a solution of continuity in the drum membrane, or through the Eustachian tube, the drum membrane remaining intact. In addition to the introduction of the pathogenic germ, certain conditions of the middle-ear must be present which render this region a favorable site for the development of the pathogenic germ introduced. In other words, the diseased organism which gains entrance to the middle-ear is the exciting cause of the inflammation. The changes which make the middle-ear a favorable nidus for the development of this germ, constitute the predisposing causes of such an inflammation.

Turning now to the predisposing causes of an acute middle-ear suppuration, we would cite, in the first instance, any condition which conduces to a chronic congestion of the upper air tract and of the tympanum. These two regions are so intimately related, anatomically, that a venous hyperemia in one cannot fail to produce a corresponding condition in the other. Such a predisposing condition then exists whenever we have an obstruction to nasal respiration such as is caused by a chronic hypertrophic rhinitis, an acute rhinitis, an acute inflammation of the naso-pharyngeal space, or an hypertrophy of the lymphatic tissue situated in

*This and the succeeding five papers which constituted a symposium before the New York County Medical Society, are published through the courtesy of the New York Medical News.

this region, constituting the condition commonly known as adenoid vegetations, or enlargement of the pharyngeal tonsil. These may be considered as the local predisposing causes. The general predisposing cause which, without any lesion of the upper air tract may render the middle-ear exceedingly susceptible to infection, may be any constitutional condition which lowers the vitality of the entire system. Among the chronic diseases we may mention chronic cardiac disease, chronic nephritis, anemia, either simple or pernicious, diabetes and so forth. Among the acute diseases we may have pneumonia, diphtheria and the exanthemata; all of these conditions, tending to lower the general nerve vascular tone of the body, render all regions more susceptible to any infection, and the middle-ear does not escape this general predisposition.

Next we come to the direct or exciting cause of the inflammation, that is, the means by which the pathogenic bacteria are introduced into the tympanum. The most simple avenue of introduction, and at the same time perhaps one of the most unusual, is through the external auditory meatus. The etiologic factor is operative in those cases of acute middle-ear suppuration which follow any perforating wound of the membrana tympani. We all know that in healthy individuals, the membrana tympani may be perforated accidentally, and, in a very large proportion of cases, unless an effort is actually made to introduce some pathogenic germ, such an injury is frequently not attended by suppuration. Given any of the predisposing causes already enumerated, however, and a wound of the drum membrane will almost invariably be followed by a purulent inflammation. This fact is of importance, clinically, in dealing with cases in which permanent perforation of the drum membrane exists. In these cases, an acute purulent inflammation not infrequently occurs as the result of neglect, either on the part of the patient or of the surgeon, through the actual introduction of septic material through the meatus.

The middle-ear is most commonly infected through the Eustachian tube. Bacteriologic investigation of the secretion from the naso-pharynx in healthy individuals almost always shows the presence of a certain number of pathoge-

nic bacteria.* The investigations of Preysing would seem to show that under normal conditions the tympanic cavity contains absolutely no bacteria of any description. Hasslauer† on the contrary, in a series of similar investigations has apparently proven that the tympanic cavity frequently contains various forms of bacteria, such as diplococci, pneumococci, staphylococci, Friedlander's bacillus and occasionally streptococci. These investigations are cited simply to prove that given a normal mucous lining of the middle-ear, pathogenic bacteria may be present not only in the naso-pharynx, but may even exist in the middle-ear itself, without causing a suppurative inflammation. Given, however, one of the predisposing causes already mentioned, together with the presence of these pathogenic organisms, even in small quantities, and a purulent inflammation results.

Time does not permit of my going further into the etiology of the condition. It will easily be seen, if the preceding remarks have been followed that an acute suppuration of the middle ear must necessarily be a not infrequent complication of any acute infectious disease, particularly of those diseases in which pathogenic germs are found in large quantities in the naso-pharynx. I here refer to measles, diphtheria and scarlet fever. From a clinical point of view, one of the most common etiologic factors is the direct introduction of pathogenic germs through the Eustachian tube by the insufflation of water through the nares. This occurs most frequently as an accident during bathing, but may follow the use of the nasal douche, too often, I am ashamed to say, advised by the medical attendant. Here, again, the predisposing factor plays an important part. It is probable that in many instances, water that is not perfectly sterile has entered the middle ear, and has failed to cause any inflammation whatever. This accident, however, if associated with one of the local predisposing causes already mentioned, is almost certain so be followed by serious consequences.

Turning now to the pathology of the condition, we find

*Centralblatt f. Bakteriologie, "Die gesunde menschliche Paukenhöhle ist keimfrei," 1899, Vol. 25, p. 535. (I. Abtheilung.)

†Klinische Vorträge, aus dem Gebiete der Otologie und Pharyngo-Rhinologie, Nov., 1901, p. 177.

that whenever we have purulent inflammation of the middle ear, this inflammation involves the upper portion of the tympanic cavity, that is, that portion of the middle ear lying above a horizontal plane passed through the short process of the malleus. This region contains numerous reduplications of mucous membrane which pass between the bodies of the ossicula and the adjacent tympanic walls. A suppuration in this portion of the tympanic cavity is always purulent, and invariably indicates that the infecting germ is of sufficient virulence to attack connective tissue. This, in contradistinction to an acute catarrhal inflammation, which is always limited to the lower portion of the tympanic cavity, a region but poorly supplied with connective tissue. We may frequently have an acute catarrhal inflammation of the middle ear, which may run its course without producing a suppuration. Even in those cases which go on to rupture of the drum membrane, the discharge is sero-mucous in character, and disappears in the course of a few days. An examination of this discharge invariably shows that the pathogenic organisms are of the milder variety, such as the staphylococcus or some of the less virulent form of diplococci. When we have to do with a streptococcus and, in a great majority of cases, with a pneumococcus infection the upper part of the cavity is almost always involved. It should also be remembered, in considering the pathology of the condition, that a simple acute catarrhal otitis, in which the infective germ is of low vitality, or in which the bacteria are only present in small quantities, may easily be transformed into an acute suppurative otitis media, involving the upper portion of the tympanic cavity, unless proper measures are taken, such as keeping the parts absolutely sterile to prevent any infection from without. We see this especially in hospital practice, where the patients are not as cleanly as they might be. A patient, presenting at first an acute catarrhal otitis media, will appear later on with this transformed into an acute suppurative otitis media, involving the upper portion of the tympanic cavity, the change in the case being entirely due to infection of the middle ear through the external auditory meatus.

I have dwelt so long upon the etiology and pathology of

this condition, that I have but little time left in which to speak of the symptomatology. Fortunately, but little need be said upon this subject. The first symptom of which the patients complain is a feeling of stiffness in the ear, quickly followed by actual pain. This pain, in a suppurative otitis, increases rapidly until it becomes agonizing and almost unbearable. In addition to the pain, the patients usually suffer from subjective noises, impairment of hearing, and there may be vertigo and vomiting. There is also, in most cases, an elevation of the body temperature. In adults the temperature ranges anywhere from 99° F. to 101° F.; in children it frequently rises to 104° F. or 105° F., or 106° F. The symptom of greatest importance in infants is undoubtedly this sudden increase in temperature. Given the case of a child suffering from one of the exanthemata in which, after the appearance of the eruption, the temperature has run its characteristic course and fallen to nearly the normal standard; suddenly, without any apparent cause, the temperature rises three or four or five degrees, and the infant seems a little restless. Such a condition should always lead to a careful examination of the ears, knowing, as we do, that this portion of the economy is exceedingly prone to be involved during the course of one of these acute constitutional diseases.

XII.

COMPLICATIONS OF ACUTE MIDDLE-EAR SUPPURATION.*

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Since the subject-matter involved in the title of this paper is sufficiently extensive to fill a volume of considerable size it will be quite impossible to attempt more than to mention those sequelae that are apt to occur in the course of this disease, and which often form a part of the general practitioner's experience.

The consequences of an acute otitis limited to the auricle and auditory canal assume quite a number of pathologic changes. Chief among them is the otitis externa, or diffuse inflammation, which extends over more or less of the cutaneous surface of the auditory canal and in severe attacks involves the auricle as well. When the inflammation is very intense, the periosteum lining the osseous canal is implicated in the morbid process, which adds to the suffering of the patient, and produces a partial or complete closure of the canal. The presence of this condition not only interferes with making a satisfactory examination of the ear drum, and offers an obstruction to the performance of a successful paracentesis, but, in addition, closes the natural outlet for middle ear drainage. It is sometimes very difficult to distinguish between otitis externa and middle ear inflammation when the swelling is limited to the inner part of the canal. The inflammatory process, when of mild character, ends in resolution, still it often passes on to exudation and exfoliation, then the process gradually abates.

Mastoid periostitis is frequently observed as a result of

*Read before the County Medical Society, Sept. 22, 1902. Second paper of Symposium.

middle ear suppuration. When we study the development of the temporal bone and grasp the variety of conditions it presents at various ages of life, the occurrence of this complication, particularly in babies and young children, ceases to be much of a problem. In the young we find that the mastoid antrum is separated from the overlying soft parts by a very thin layer of bone richly perforated by various channels, along which inflammation may readily extend; then the fissures or sutures which remain open until puberty and sometimes never completely ossify—the squamo-mastoid fissure being the one in this region—for a pathway which facilitates the rapid extension of inflammation from the internal to the external mastoid cortex. In such a manner large collections of pus may form behind the ear before the membrana tympani ruptures, showing that the pus has followed the path of least resistance. More or less pain ushers in an attack which is followed by redness and swelling of the soft parts above and behind the auricle. The auricle soon takes the characteristic position of being pushed forward and downward almost at right angles to the skull. The extent of surface involved by an abscess may be limited to the mastoid region or reach from the tissues in the neck to the vertex. Occasionally we find inflammatory diseases limited to the soft parts of this region which are quite independent of any previously existing otitis; therefore a careful inspection of the ear drum is necessary in all cases before a correct diagnosis is possible.

Inflammation of the mastoid cells is most apt to occur as a complication when there is delayed perforation of the drum, insufficient drainage, and an impermeable Eustachian tube. This subdivision of the ear is the natural outlet of the tympanum, but through an early participation in the inflammation its tympanic mouth is tightly closed, and unless there is an artificial outlet made for the purulent accumulation, the anatomic relations of the tympanum, antrum and mastoid cells, offer an almost unobstructed path for its extension. One of the most reliable indications of a beginning attack of acute mastoiditis, is the persistent excruciating pain. Tenderness on pressure over that part of the mastoid known as the antrum, and over the tip of the

process, associated with more or less swelling of the soft parts, are generally present. Fever in children is usually pronounced in the early stages, while in adults its exclusion does not necessarily indicate an absence of the disease. Symptoms of septicemia are by no means rare, and delirium, when present, does not mean a fatal issue. Obliteration of the posterior auricular fold is a symptom usually indicative of mastoid periostitis, which, when following an attack of middle inflammation, demonstrates the presence of inflammation of the mastoid cells. All signs of mastoiditis, except pain, may be absent, and it is usually encountered in those cases where the cells have become obliterated through some prior pathologic process. A sinking of the upper posterior auditory canal is considered either a reliable symptom of mastoid empyema, or inflammatory activity located within the mastoid antrum.

As a result of continued pressure of pus within the tympanum, there may be destruction of the soft parts here and there, which ultimately leads to superficial caries of the osseous structure, and one of the anatomic divisions frequently seen to suffer in this way is the Fallopian canal. While facial paralysis is generally observed as a result of long standing inflammation, occasionally more or less paralysis follows in the progress of an acute otitis. This complication is most often seen in young children where there is a lack of osseous development of the Fallopian canal, thereby making inflammatory extension to the exposed portion of the nerve comparatively easy.

Adenitis of the cervical and post-auricular glands is often seen as a complication of acute otitis, but it rarely extends beyond the point of producing some degree of tenderness. Where the mastoid is extensively involved a true suppuration of the glands may follow. This is especially true in the tuberculous and strumous diatheses.

Retro-pharyngeal abscess as a result of purulent inflammation of the tympanum, may occur through an extension of pus into the Eustachian tube, which is apt to induce dysphagia and dyspnea.

Although the proportional occurrence of intracranial inflammation following acute middle ear suppuration has not

as yet been definitely determined, its frequency is no longer a matter of speculation. The construction of the temporal bone with its many cavities and intercommunicating air spaces tends to favor the retention and decomposition of pus, and its intimate relation to the other component parts of the skull permits the various pathologic micro-organisms easy ingress not only to the cranial cavity, but to all parts of the economy through infection of the large venous channels lying in close proximity. The routes by which the inflammation is most apt to extend are by the tympanic roof and the inner posterior wall at the concavity for the sigmoid sinus. Septic material easily penetrates and extends along the many apertures for blood vessels and lymphatics that richly perforate the bone in all directions, while the unossified condition of the petro-squamosal fissure, through which a fold of dura mater passes and lies in direct contact with the mucous membrane of the middle ear, often leaves no effectual barrier to check the inflammatory advance, no matter what its nature may be. Although it is generally conceded that the greater number of cerebral complications follow the chronic form of middle ear suppuration, the danger of widespread infection from acute suppuration is becoming more widely recognized. There is more or less of a localized meningitis in nearly every severe case of acute otitis suppurativa in young people, which, fortunately, rarely develops into a general basilar meningitis, although a lack of proper treatment at the right time may aid it in becoming so. The presence of carious bone is more dangerous to the dura than the open condition of the sutures, for these bone defects are often so firmly closed with fibrous tissue that an excellent protection is thereby afforded to the overlying meninges. I believe it was Brieger who reported a number of sections made on the temporal bone in cases of acute otitis where the sutures were found to be protected in this way, and in no instance was there any indication of the purulent process entering the middle cerebral fossa. While this result is remarkable, and seemingly somewhat accidental, it nevertheless offers an explanation why inflammatory extension is so rapid in some cases and so slow in others, as this anatomic condition is by no means a constant factor. Meningitis,

inflammation of the lateral sinus, and extradural abscess, are the critical complications apt to follow severe attacks of acute middle ear suppuration, although much may be accomplished in the early stages of the otitis to prevent their development. Rapidity of inflammatory extension is nearly always seen in the cases of influenza infection.

In conclusion, let me say that in all obscure diseases of children, repeated and careful examinations of the ear should never be neglected, for the excellent work of Ponfick, who made 100 autopsies upon infants dying of various acute and chronic diseases, where in the majority of the cases, middle-ear inflammation was not suspected, showed nevertheless that it was present in all but nine of them. He believes therefore that the tympanum acts as an incubator and generator, promoting toxic symptoms in localized infective diseases. Pomeroy, of Boston, has verified this observation in a very able paper.

XIII.

THE TREATMENT OF ACUTE SUPPURATION OF THE MIDDLE EAR. .

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In the brief time allowed for the presentation of this paper I shall attempt only to make a few practical statements outlining the present status of the treatment of acute middle-ear suppuration. A patient who is undergoing an acute suppurative process in the middle ear has, pent up in a bony canal, a quantity of septic material which usually finds vent by way of the tympanic membrane, but which may at the time find access to other, near-by and connecting bony cavities, often resulting in serious and, sometimes, fatal complications. Even in the simplest cases patients present the symptoms of sepsis as indicated by rise of temperature and rapid pulse. It is therefore of the utmost importance that these patients should be placed in bed, and remain there from the very commencement of the attack until the more acute symptoms have passed away. It is not customary to consider such patients ill enough to be so confined, but it should not be forgotten that a severe septic inflammation is in progress with elevation of temperature, rapid pulse and excruciating and exhausting pain. Confinement in bed aids greatly as an abortive measure as well as giving proper rest and protection from cold. Preventive treatment may be further outlined by referring to the many and varied opportunities for forestalling the attacks. There are certain diseases and diseased conditions which surely predispose to them.

First and foremost is the presence of adenoid tissue in the vault of the pharynx. This tissue is a hotbed for the retention and development of infection and the victims are con-

stantly menaced by the entrance of septic material into the open doors of the Eustachian tubes. Indeed, adenoid patients actually do have "running ears" in far larger proportion. It is obvious that all adenoid patients should undergo operation but especially is this true in one who has had even a single attack of middle-ear suppuration.

Ear complications of grippe can generally be prevented by careful treatment of the nose and nasopharynx at the very commencement, and, during its entire course, cleaning and detergent sprays, in fact, any treatment which tends to render these tissues clean and free from secretions, may be resorted to. Added to this the patient should be cautioned to avoid violent blowing of the nose—a procedure which, no doubt, often effects the introduction of infected material into the middle ear. Ear symptoms of more or less severity always accompany the exanthemata, especially scarlet fever and measles, and suppuration often results.

That much may be done to prevent such suppuration, and that but little is actually done by practitioners seems to be a fair criticism. During a recent season when measles were prevalent the writer took pains to learn how much even our best and most skillful physicians attempted in the way of prevention of middle ear suppuration. These observations led to a belief that during the early stages of the exanthemata rarely any attempt is made to cleanse the nose or nasopharynx of surplus septic secretion. These patients should receive the very same care as that already recommended for grip. Almost any detergent non-irritating alkaline spray will serve the purpose. A tablet made up of sodium salicylate, sodium bicarbonate, boric acid (aa gr. iiijss), oil gaultheria, q.s., dissolved in one ounce of sterile water, has been found to be almost without irritating qualities. This tablet was devised and first used at the Manhattan Eye and Ear Hospital and in that institution is called the Manhattan tablet. Free purgation, preferably by means of calomel, is a most helpful clinical adjunct, especially when administered at the very commencement.

For the relief of the excruciating pain during the time previous to the establishment of the discharge, not much can be accomplished, aside from the use of heat and narcotics.

If examination of the drum shows clearly that no pus has yet formed, the canal should be irrigated with large quantities of hot sterile water at half hour intervals. A large douche bag hung high enough to give sufficient force to the stream is probably the best method for hot water irrigation. The temperature of the water may be from 100° to 110° F. Added to this should be the internal administration of some form of narcotic which will be far less harmful to the patient than the prolonged excruciating pain. Such remedies as hot oil and laudanum, the heart of an onion and a long list of similar ones are only mentioned to be condemned for obvious reasons. If the discharge has not actually commenced and the tympanic membrane is bulging or otherwise giving evidence of the presence of pus in the cavity, a free incision should be made. It requires some experience to make this incision properly, but incision is preferable to puncture. Such incision should be made under strictly aseptic surroundings and it should be carried not only through the membrane proper but upward through the attic region and well out on the wall of the canal. This serves to open freely both the tympanum and attic, and also to bring about a free flow of blood, thus greatly relieving the congestion. Many serious results may be avoided by resort to early incision.

Treatment during the attack.—After the discharge is established it is necessary to decide upon the course of treatment to be followed and in so doing we should not forget that the chief requirements are cleanliness and free drainage—and cleanliness should refer to the nose and naso-pharynx as well as to the external ear and auditory canal. Time will not permit even a narration of various plans suggested in the books and writings of otologists. Frequent irrigation with a one to 4,000 sterile solution of bichloride of mercury, thoroughly cleansing the canal of all discharge, using one to two quarts at each treatment is perhaps the easiest and best method. This should be done every two hours. With young children it is necessary to use some force for the first few treatments, but after a little they submit with good grace. For the past few months in the outdoor clinic of the Manhattan Eye and Ear Hospital I have been using formaldehyde solution in the same manner. Very careful instructions should be given

to the mother or nurse as to doing this work thoroughly, and at each daily visit the attending physician should give a complete treatment himself, wiping out all surplus secretions with a cotton probe and making a careful examination of the condition of the drum and the canal by means of reflected light. This procedure is necessary both for the benefit of the patient and also that the mother or nurse should see exactly how the work should be done. At each visit pressure should be made over the mastoid, especially over the antrum and tip, and the patient questioned, to discover if there be pain in this region. A small quantity of sterile gauze should be packed loosely in the outer part of the canal and changed as frequently as it becomes soaked with pus.

It should be the routine procedure in both private and hospital practice to make microscopic examinations of the pus in all acute cases of middle-ear suppuration. Such examination should be made as soon as possible after the establishment of the discharge. The predominance of certain organisms, especially those accompanying grip and the exanthemata, becomes of importance when complications arise. It has been fully demonstrated that when the more virulent organisms predominate serious complications are more liable to arise. When mastoid involvement occurs during the course of middle-ear suppuration one's judgment is usually subjected to a severe test. The very early symptoms may be, and sometimes are, relieved by measures other than external operation. Free incision of the drum membrane as heretofore indicated may be sufficient. In fact the whole theory of such relief is based upon the importance of free drainage. So that when the antrum itself is involved, the danger of further involvement of the mastoid cells may be avoided by establishing such drainage. This, together with local blood-letting by means of real or artificial leeches and the application of either the ice coil or, as some prefer, hot poultices and the hot douche, about exhausts the list of abortive measures. Aside from the ice coil and the establishment of free drainage in the canal, the benefits to be derived are at least meager. The great tendency is to make use of preventive measures for too long a time. The ice coil should not be used longer than 24 or 36 hours, after which

time it may become a dangerous application on account of its proneness to mask the symptoms. Continued use of poultices is equally bad. In fact, any prolonged attempts to abort mastoid suppuration are to be deprecated. The patient, of course, should be confined to bed and should remain there until all mastoid symptoms have passed away.

While opinions may vary to a marked degree from operating at the very commencement of mastoid involvement to a delay which may lead to extensive complications, there certainly must be a period when operation should no longer be delayed. Prolonged tenderness upon pressure in the region of the antrum together with the bulging of the atticus tympanicus and the superior posterior wall of the canal constitutes sufficient reason for operative procedure, and especially so when the pus contains the more virulent micro-organisms. In other words external operation should be performed in acute suppuration of the mastoid cells when a permanent remission of symptoms has not been brought about by free drainage through the drum membrane, or by such local applications as have heretofore been described, and when this time has arrived there should be no delay. The majority of hospital cases and many of the private ones have already reached this stage before they come under the care of the otologist. Just when the exact time arrives may not be measured by days or hours. The date must be determined by the good judgment of those who have the patient in charge.

Many delays in operating come either from lack of willingness to consent upon the part of the patient, or his family, or from the extreme conservatism of the family physician. Conservatism is a quality not to be ignored, but when carried to the extreme it reacts to the great detriment of the patient. The same statement may be equally true when applied to radicalism. Indeed, it is quite possible for the conservative to be radical in his conservatism, and of the two it would seem to be preferable that one should be conservative in his radicalism rather than radical in his conservatism.

Another strong point in favor of early operation is the better results to be thus obtained. Early operation usually will be followed by practically perfect hearing on the affected

side. It must not be forgotten that pus pent up in the mastoid cells is in a position to seriously menace near-by vital structures. Not more important is it to remove the suppurating mastoid cells.

General treatment.—A very careful examination of the general physical condition of the patient should be made and the facts relating to his habits, digestive and eliminative functions should be ascertained and set right. The general or internal treatment may often be commenced during the suppurative period, so soon as the temperature becomes normal. The internal treatment should be just whatever the general condition of the patient seems to require. Iron, cod-liver oil, strychnine, iodide of potash, creosote and hypophosphites may be mentioned as most helpful medicaments. Freshly made syr. ferri iodide is mostly used in our large ear clinics. These tonics are to be given not only because of the general condition of the patient requires such treatment, but because such improvement in turn brings to bear a most helpful influence upon the suppurative process.

Conclusions.—(1) In acute middle-ear suppuration early and free drainage is of the utmost importance; (2) patients should remain in bed until acute symptoms have passed; (3) free purgation (preferably by means of calomel) should be resorted to; (4) microscopic examination of pus should be made; (5) local treatment should consist of cleanliness and free drainage; (6) proper internal medication should not be avoided; (7) prolonged attempts to abort suppuration of the mastoid cells are to be condemned; (8) early operative interference in mastoid suppuration prevents the more serious complications and gives far better hearing results; (9) uncomplicated cases of acute suppuration of the middle ear, when properly treated always recover in from two days to three weeks; (10) the responsibility for preventive treatment must be largely assumed by the family practitioner. He should fully appreciate the importance of preventive treatment when caring for grippe, the exanthemata, or other infectious intra-nasal conditions, and also, the early and complete removal of diseased adenoid tissue.

XIV.

THE ETIOLOGY, PATHOLOGY AND SYMPTOMATOLOGY OF CHRONIC PURULENT OTITIS MEDIA.*

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The serious complications which appear during the course of chronic purulent disease of the middle ear, emphasize the importance of treating this affection with earnest consideration.

Chronic otorrhea is more prevalent than the general practitioner is apt to believe from personal experience. When we learn through a recent report† of an examination of school children, carried out by Arthur Cheate, in London, that out of 1,000 children, 335 had discharge from one or both ears, the frequency of this condition is rather astounding.

Etiology.—In the majority of cases this disease follows an acute infection of the middle ear which has been neglected or improperly treated. Syphilitic and tubercular manifestations are the exceptions to this rule. The latter changes may progress insidiously without much local discomfort except for the loss of hearing and the presence of a purulent discharge. The previous history and a bacteriologic examination will assist in excluding these systemic infections. Scarlet fever, measles and diphtheria are potent factors in causing middle-ear disease in early life, while influenza has in recent years been followed by severe and prolonged aural complications.

*Read before the New York County Medical Society, Sept. 22, 1902. Fourth paper of Symposium.

†Journal of Laryngology, June, 1902.

Though much has been said and written upon the influence of nasal and post-nasal disease in aural disturbances, I cannot pass by this portion of the subject without mentioning the fact that my present experience certainly corroborates the observations recorded in my paper upon "Adenoids: A Contributive Factor in Aural Affections," which was read before the Pan-American Medical Congress in 1893.

We should examine the pharyngeal space in all ear cases, be they catarrhal or purulent inflammations, and we will often find the cause of a persistent discharge and other annoying symptoms. It is not uncommon to see marked improvement in such cases after the removal of a hypertrophied pharyngeal tonsil. These growths, by their presence, keep up a congestion of the adjacent tissues, and act as an obstruction to the pharyngeal and tympanic circulation. The recesses which exist between the folds of the lymphoid hypertrophy offer a suitable habitation for the generation of infectious bacteria. These find their way through the Eustachian tube and exert their deleterious influence upon the tissues in the middle ear and neighboring cavities.

Pathology.—Micro-organisms of a pathogenic nature are the important element in the production of purulent otitis. All the conditions favorable for their growth and propagation are found in the tympanic cavity, but we seldom obtain a pure culture of a germ from this chamber. The infection is almost always of the mixed variety, though the *Staphylococcus pyogenes* is probably the most constant. With the invasion of streptococci and pneumococci the inflammation assumes a more virulent aspect, and dangerous complications are liable to follow. The continued presence of either of the latter microbes lends additional weight to the importance of hastening surgical intervention in doubtful cases.

Moos has found that during catarrhal exacerbations the mucous membrane of the pharynx and the middle ear becomes infiltrated with innumerable polymorphous cells, causing the membrane to become hyperplastic. There is no tendency to purulent disease under such conditions, unless a change occurs in the nourishment of these tissues. If the resistive power weakens, the micro-organisms rapidly increase in number, and infection results. The smaller the number

of microbes, the less liability there is to pus formation. In children, the invasion enters through the Eustachian tube very early, as this channel is wide and short. In eruptive diseases, the circulatory and lymph vessels are apt to carry the infection. Hematogenous changes are inclined to become chronic in character, as the healing of the parts is more complicated.

In prolonged suppuration, the microscope shows that the drum and mucous membrane of the middle ear are hyperemic and hypertrophied, with round celled infiltration.

Schwartz states that this overgrowth invades the pneumatic spaces, and also imbeds the ossicles as it advances. In some places the epithelial layer of the membrane is thrown off and ulcerations exist. Owing to these changes, synechia form, and the ossicles, together with the tendons of the tensor tympani and stapedius muscles, become bound down.

If the inflammation continues granulations and polypi appear, and the periosteum becomes involved; the ossicles and bony walls are attacked by the round celled infiltration, and necrosis results, with dislocation of the bonelets and exfoliation of the adjacent bone. In this manner the attic, aditus and mastoid cells become affected. Fistulae through the tegmen tympani are formed and infection spreads to the dura and cranial cavities. Cerebral complications are consequently most frequently associated with chronic purulent disease.

If the path of infection extends through the posterior wall of the mastoid, sinus involvement and cerebellar abscess may result.

In some skulls the bony capsule of the jugular bulb stands out prominently along the floor of the middle ear, and may become diseased early in the course of a severe infection, causing a septic thrombus in this portion of the venous circulation.

In persistent purulent otitis, we find a loss of a portion of the drum membrane. At times, the entire membrane has been absorbed, and the remains of the ossicles may be seen hanging in the middle ear. When the secretion is small in quantity, it may form a crust over a small perforation, and the latter may be overlooked in a cursory examination. The

position of the perforation assists in locating the disease. If the opening in the drum is situated in Shrapnell's membrane it usually signifies necrosis of the ossicles or involvement of the attic. As the incus is scantily supplied with blood vessels, it is the first of the ossicular chain to become diseased. It is only in long-standing cases that the posterior wall of the middle ear becomes affected, except in tubercular or other severe infectious inflammations. The folds of mucous membrane which line the upper portion of the tampanum become hypertrophied and so retard drainage, thus exposing the adjacent cavities to the infectious secretion. In this manner the mastoid becomes involved in acute manifestations, and we must bear in mind this anatomic feature, as these reduplications of membrane must be attacked when drainage is obstructed, consequently the bulging drum must be incised high up and deep, when mastoid symptoms exist.

Symptomatology.—Loss of hearing, with an intermittent or persistent discharge, are the most frequent symptoms of this chronic affection. A weeping eczema of the canal may give rise to moisture, without the existence of middle-ear trouble. If, however, the purulent discharge from the ear is acrid, the skin becomes macerated and a dermatitis results. Frequently the canal is secondarily infected, and a furunculosis develops. Such a lesion may so obscure our vision that the inner portion of the canal cannot be seen, and it is impossible to determine at the first examination whether the middle-ear suppuration is the exciting factor. The character of the discharge will at times indicate the presence of bone necrosis, especially if the secretion is greenish or foul-smelling. A bloody discoloration suggests the presence of granulation tissue or polypi, while a distinct blue tint is due to the *Bacillus pyocyaneus*, and also indicates bone disease. When the discharge is profuse and reappears immediately after our attempts to clean the canal, we should suspect a reservoir of pus in the mastoid process, or neighboring cavities, and must not hesitate to employ surgical measures. The quantity of the discharge is augmented by catarrhal changes, current diseases and trauma. A seemingly trivial otitis may suddenly assume an alarming aspect, and even terminate fatally in a rapid manner.

To illustrate the preceding statement I briefly mention the case of a young man, twenty years of age, who came under my care a year ago. His right ear had been discharging off and on for 10 years without much annoyance, except for some loss of hearing on that side and a slight amount of secretion. A week before I saw him he was struck over the ear by the fist of one of his companions. The same day, pain set in, and the discharge became profuse and bloody. A few days later, there was an offensive odor to the secretion and the pain radiated over the right side of the head. His temperature rose to 103 F., and chilly sensations appeared. Pressure over the mastoid and its tip revealed tenderness. The patient presented a distinctly septic picture, so the mastoid was opened and found extensively diseased, together with thrombosis of the lateral sinus and internal jugular vein. The latter was ligated near the clavicle, and the sinus thoroughly curetted. Reinfection of the posterior portion of the sinus occurred, and two subsequent operations were performed in two weeks, and the sinus was found diseased toward the torcular. Fortunately the patient recovered, but the history of his case shows that a chronic suppuration may exist for 10 years without causing much inconvenience to the individual, until an exciting factor reawakens the slumbering sepsis to renewed activity. Pain is not a characteristic symptom in chronic cases, except during an exacerbation. It is then suggestive of further extension, and should be carefully considered.

It is not unusual to find marked destruction of the mastoid in this phase of the disease without distinct premonitory symptoms. Invasion of this process has followed the removal of diseased tissue from the middle ear due to disturbing nature's protecting zone of granulations. These accidents demonstrate the importance of careful asepsis in seemingly minor aural operations.

If during a purulent otitis, the patient experiences a chill or chilly sensations, with a sudden rise of temperature, we must at once suspect an extension of the infectious process, and think of the presence of pyemia, sinus thrombosis, meningitis and cerebral complications.

The dangers that lurk in a chronic discharging ear, cannot be too strongly impressed upon the public at large. Professor William Macewen has tersely remarked, "We cannot too often recall the warning that the virulence of an otorrhea cannot be measured by the quantity of the secretion, its odor, or the slightness of its initial symptoms, and that the pyogenic process may proceed insidiously until some accidental circumstance precipitates a dangerous or fatal crisis."

38 East Sixtieth Street.

XV.

COMPLICATIONS OF CHRONIC SUPPURATION OF
THE MIDDLE - EAR*.

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In the brief ten minutes allotted for the presentation of this division of the topic under discussion it will be possible to speak only of those phases of the subject which deal with the etiology of the complications of chronic purulent otitis media, and of the frequency and serious nature of these complications.

Dr. Clarence J. Blake, of Boston, in a paper on "Otology and General Medicine," speaks of Prof. Politzer as holding up, in the course of one of his lectures, a temporal bone by the styloid process, and, while turning it slowly around before his class, making the following statement: "Gentlemen, the temporal bone has four sides; the outside is bounded by life, from which there comes, through the opening of the external auditory canal, one form of our appreciation of what life means; on the other three sides this bone is bounded by death."

That this metaphorical but forcible description is practically true is readily comprehended when the number and importance of the anatomic parts which may be involved and the serious pathological processes which may develop as complications of an acute or chronic purulent otitis media

*Read at the meeting of the Medical Society of the County of New York, Sept. 22, 1902. Fifth paper of Symposium.

are taken into consideration. It is my province to speak only of the complications of chronic purulent otitis media. What are these complications?

First, we have those which relate to the parts primarily involved, and among these may be mentioned the following pathologic lesions: The membrana tympani is wholly or in part destroyed; a portion of, or all of, the mucous membrane lining the tympanum has lost all of its characteristics, and in its place are to be found granulation tissue and polypi; similar changes are observed in many cases in the adjacent related cavities; one or more of the ossicles are carious or they may have been totally destroyed; or there may be a necrosis of tympanic walls. In a second group may be placed those complications which involve still other auditory structures, as, for example, a necrosis of the petrous portion of the temporal bone, with destruction of the auditory nerve; a cholesteatomatous mass in the mastoid antrum; or a mastoiditis of such portions of the mastoid process as may have escaped eburnification.

As a result of these pathologic changes there is an impairment or loss of the important function of hearing.

In the third and last group belong those complications which involve other organs than those of audition. Thus, for example, one of the sinuses at the base of the brain may become involved in a septic inflammation, with the formation of a septic thrombus; the internal jugular vein and, in rare cases, the carotid artery may also be involved in a similar inflammation.

The dura mater may be the seat of a general or a localized pachymeningitis or extra-dural abscess; the pia mater and arachnoid may also be involved, *i. e.*, there may be a leptomeningitis; or the septic infection may invade the cerebral structures, giving rise to the formation of an abscess cavity in the substance of the brain. A facial paralysis may occur as a result of an erosion of the Fallopian canal.

The respiratory organs may be infected and there may be a septic pneumonia or a septic pleurisy. A metastatic abscess may develop in the liver or the spleen, or in some other part of the body.

A septic synovitis may involve one or more joints. A gastro-enteritis may occur as the result of the infected material passing down the Eustachian tube into the pharynx and then being swallowed. Or, finally, a general pyemic condition may be established.

It is remarkable, not that so many cases of intracranial and other complications arise in the course of a chronic purulent inflammation of the middle ear, but that many more cases do not occur; for upon reflection it must be admitted that almost ideal conditions exist in and near the middle ear for the propagation of pathogenic germs, and for their penetration into neighboring regions. It is also a fact that this invasion of neighboring regions is still further promoted by gross negligence on the part of the laity, and, to a certain extent, by the failure of medical men to realize the dangerous nature of this class of cases. Fortunately, the latter statement is growing day by day less true.

We find, in considering these points more in detail, that, in the first place, the disease is seated in a small cavity (the tympanic cavity) and that, in many cases, it involves secondarily the smaller adjacent cavities of the mastoid antrum and the mastoid cells, *i. e.*, cavities which are full of little niches and pockets, which are dark and of a uniform temperature, and which are lined with a mucous membrane that has become diseased and is secreting an abnormal amount of acrid fluid. In fact, we have here an ideal incubating chamber and medium for the generation of germ life. Micro-organisms (both saprophytic and pathogenic) are to be found in many varieties and in swarming colonies in all cases of chronic purulent otitis media. The pathogenic varieties most often observed are the streptococci (the most virulent of them all), the staphylococci and the pneumococci; while tubercle bacilli, the *Bacillus intracellularis*, Friedlander's bacillus, the typhoid bacillus, the bacillus of diphtheria and the *Bacillus coli communis* are also at times found upon bacterial examination of the purulent exudate obtained from this focus of disease.

With the probable exception of those cases which are due to tuberculous or syphilitic disease, all cases of chronic

purulent otitis media result from a neglected acute otitis media. The inflammation, as it becomes chronic, changes the character of the mucous membrane in such a manner that in time the connective-tissue element largely predominates and the formation of granulation tissue with polypi is the result. Owing in part to the diminished blood supply and in part to the action of the bacteria, a necrosis of the ossicles and of the bony walls of the tympanum is started. These lesions extend until other cavities and structures are involved in the same destructive process.

There are many paths along which infection may travel from the original seat of the disease to most important and vital parts. The bacterial invasion may reach the meninges or deeper brain structures by way of the vascular system; thrombi may form in the small veins which pass from the tympanum and its contiguous structures into the neighboring sinus, and through the infection of the latter the veins which lead into it from the cerebral tissues may similarly become infected; or a thrombus may form in some small vessel, disintegrate, and be carried (because of a reversal of the blood current owing to occlusion of the vein and also in a measure to the lack of valves in the veins of this region) into the cerebral tissues; the bacteria may advance along the perivascular sheaths of the arteries and thus give rise—although such an occurrence is rare—to septic thrombi in the arteries themselves.

The lymphatics afford another pathway along which infection may travel to other structures. In rare cases the infection may extend from the middle ear, through the horizontal semi-circular canal of the vestibule, into the labyrinth, and thence by way of the internal auditory meatus to the meninges. Again, infection may be the result of direct contact made possible by the destruction of, or because of a dehiscence in the bony partition separating the cerebral from the middle-ear cavities. Another means of infection was well illustrated in a case which was under my care during the past spring. In this case a sinus led from the antrum to the cortex of the mastoid process, where a very large subperiosteal abscess formed. The upper limit of this abscess ex-

tended as high up as a point a short distance above the parietal eminence. A little below this eminence the bone was necrotic, and that the necrosis had extended from without inward was made evident, when the necrotic bone was removed, by the extent of the necrosis externally and its limited area on the inner table. At this point there was an extra-dural abscess, connected by a fistulous tract with a cerebral abscess; the extra-dural abscess did not extend downward farther than within three-quarters of an inch of the floor of the middle cerebral fossa—a further evidence that the infection was not conveyed through the tympanic roof. In this case, therefore, it is reasonably clear that the infection chose a most roundabout path.

A disintegration of a thrombus may occur and particles of it loaded with bacteria may pass into the general circulation, to give rise to a metastatic abscess, a septic pneumonia, or a septic pleurisy; or, as I have before stated, pus may pass through the Eustachian tube into the pharynx, to be swallowed and give rise to a gastro-enteritis.

That these complications are not rare, statistics easily prove. In this country about 4,000 cases of brain abscess of otitic origin, or about one in every 19,000 of population, annually die, while, according to Koerner, the Prussian statistics for 1885 give a death-rate for otitic brain abscess in that country about three times as great as that given above for the United States, or about three for each 20,000 of population. Whether the number for this country is lower because of the higher general intelligence of the people, which causes them to be less neglectful of a disease of the ear, or because of better hygienic and other conditions (favoring as they must a small number of cases with aural disease), or whether the number may not perhaps seem to be less because of the less exhaustive character of our statistics, are questions which at present I am unable to answer.

According to Pitt the number of brain abscesses which occur from otitic disease amount to 30 per cent. of the whole number. Barr estimates it as high as 50 per cent. of the whole number of abscesses of various origin. Pitt estimates

that five per cent. of all cases of sinus-phlebitis are of otitic origin. In 17,028 autopsies in London death was due in 102, or one in 167, to an otitic lesion.

In 10,707 cases with tympanic suppuration 69 deaths, or one in 155, occurred as the result of some aural lesion (Koerner). In 38,017 aural patients death occurred as a result of the disease in 119, or one in 319 (Buerkner's and Randall's individual statistics added together). As to other lesions, such as general pyemia, pneumonia, etc., I have been unable to obtain any statistics.

Of all the intra-cranial complications pachymeningitis is the most common. Under this designation are included also those cases of so-called extra-dural abscess, which is a limited pachymeningitis walled off by adhesions from the rest of the brain surface. In the same category are also placed those cases which are known as perisinus abscesses, a condition which is in fact a pachymeningitis limited to the site of the sinus.

According to Jansen, pachymeningitis is four times as common as sinus-phlebitis, and 20 times as common as brain abscess. When either of these latter lesions occurs pachymeningitis is generally to be found associated with either or both of them, and especially is this the case with regard to sinus-thrombosis.

Leptomeningitis is an affection of the arachnoid and pia mater in which the infective material is carried along the minute blood vessels that lead from the brain. These cases are very fatal. Cases of serous meningitis of otitic origin, which, as I believe, occur more often than we have hitherto supposed, if recognized early and operated upon in such a manner as to secure good drainage, stand a very fair chance of recovery.

In brain abscess the cavity is connected in 92 per cent. of the cases with the suppurating ear by a fistulous track. In 95 per cent. of the cases there are multiple abscesses. In 6.6 per cent. of the cases the abscess lies within the brain and is separated from the source of the disease by normal

brain tissue. The majority of these abscesses are to be found in the cerebrum, and of these the larger proportion are to be found in the inferior and posterior portion of the temporo-sphenoidal lobe. The next most common site is in the anterior and lateral portion of the cerebellum, behind the petrous portion of the temporal bone. Other portions of the temporo-sphenoidal lobe and also of the frontal lobes are often found to be involved, and in a few cases the occipital lobe has been the seat of the abscess.

Next to pachymeningitis, sinus-phlebitis and thrombosis occur the most often of all intracranial complications. The sigmoid sinus is the one most frequently involved and is generally accompanied by a perisinus abscess. By extension of the disease the internal jugular is very often involved, and the occurrence of general pyemia and other septic conditions elsewhere is frequent. When the superior petrosal sinus is involved a necrosis of the posterior and superior portion of the petrous portion of the temporal bone is likely to be the consequence. When the inferior petrosal sinus alone is involved it is the result of a necrosis of the apex of the pyramid or it is due to a purulent inflammation of the labyrinth. The cavernous sinus is seldom involved. In 82 per cent. of the cases the bone necrosis extends through the inner table of the mastoid process and is in direct contact with the sinus wall.

To prevent the development of these most serious complications the medical adviser must urge the necessity of dealing with every case of chronic purulent otitis media as something not to be lightly regarded, but as a disease which must be eradicated, no matter how innocent a case it apparently may be.

The disease is capable of advancing most insidiously and often without any symptoms until a very extensive destruction, not alone of the tympanic cavity and its adnexa, but of the brain tissues as well, has taken place. Brain abscesses have often been found at the autopsy to have been the cause of death when no such lesion was suspected in life. How many more cases of this and other pyemic complica-

tions of otitic disease die annually in which death is attributed to the complicating pyemic metastasis, or to apoplexy, or to heart disease, may only be suspected.

In the words of MacEwen, "One who has a chronic purulent otitis media is liable to have, with very little warning, a most serious or even a fatal illness."

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XVI.

THE TREATMENT OF CHRONIC SUPPURATION OF THE MIDDLE EAR*

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The time allowed me admits of but crude handling of such a large subject, and I shall be able to touch only briefly upon some of the main points, with a reference to or mention of other more important operative measures for the relief of this disease.

At the outset, it is well to understand what is meant by the term "Chronic Suppuration" when applied to the ear.

The writer would define this as an inflammation of the structures which form the middle ear, that lasts for a period of six months or more, with or without treatment.

There are many methods advised at the present day in the treatment of this disease, but clinically we shall consider only two, the dry, and the irrigation or wet treatment.

In treating this disease we should have three objects in view; first, the cure of the otorrhea; second, the improvement of the hearing; and third, the relief of the subjective sounds, when present.

At the beginning of treatment a careful examination of the nose and naso-pharynx should be made and, should obstructions exist in one or both localities, they should be removed, as in children and young adults a very common cause of middle-ear suppuration is the presence of adenoid tissue in the pharyngeal vault.

At the outset, the first cardinal principle is to secure and maintain cleanliness of the auditory canal and the parts adjacent. After this has been accomplished, the next import-

ant point is to determine just what structures of the middle ear are involved, as this will have a decided bearing upon the prognosis of the case. We should determine the location of the opening in the drum membrane, and whether the present opening is draining the cavity behind it sufficiently, and if not, this opening should be enlarged, so as to promote drainage. Usually the higher the perforation in the drum, the greater the involvement of the structure beyond, and the less tendency to a kindly healing. We should ascertain at the first examination, and before treatment is begun, if any caries of the ossicles or adjacent structures exists, and this can easily be made clear by cocainizing the point of the perforation, and using the silver probe to palpate with, but the mistake should not be made of calling every particle of exposed bone "dead bone."

The dry treatment is carried out in the following way: The hands of the person who is to treat the case are first made sterile; sterilized cotton is used on a carrier to thoroughly wipe the canal dry. After this drying process, a fine powder is insufflated over the drum surface as well as the canal walls; the powder used varies with the person treating the case: xeroform, nosophen, boric acid, acetanilid, aristol and iodol have all been used with good results; after this, a small wick of gauze iodoform, borated, or plain sterilized, is passed up and, if possible, into the perforation, and the canal is loosely filled to the meatus.

If the opening in the drum be too small to admit the end of the gauze wick, then the canal is loosely packed from the drum to the meatus, and the gauze thus acts as a siphon to carry away the discharge. As soon as the gauze becomes thoroughly moistened with the discharge, it should be removed and the process of cleansing the canal carried on as before. The chief objection to this method of treatment is the absence of a trained nurse to carry it out on antiseptic lines; if this could be arranged for it might in the future become the ideal way of treating this disease; but when such treatment is left to the patient or to some member of his family, who knows practically nothing of what the word "sterile" means, it would seem that the disease might be prolonged to an indefinite period, owing to reinfection constantly

taking place; and to put such a method of treatment in the hands of a hospital or clinic patient would seem to the writer a prolific cause in maintaining the disease.

The irrigation or wet treatment is the one ordinarily used to-day among the majority of aurists, and consists in syringing the ear with one of the following solutions: Bichloride of mercury in the strength of one to 4,000 to one in 8,000 of sterile water; a solution of boric acid of the strength of 20 grains to the ounce of boiled water; a solution of carbolic acid ranging in strength from one to two per cent.; a weak solution of formalin and a solution of potassium permanganate; a normal saline solution or warm sterilized water is all that is necessary in many cases; indeed, I believe we could dispense with all others except the warm saline solution, did we but try. When the patient is seen by the surgeon, and after the parts are cleansed in the manner described, a good solution to further sterilize the parts is one composed of equal parts of the solution of bichloride of mercury one to 1,000 and absolute alcohol; to this can be added boric acid from 10 to 20 grains to the fluid ounce. If granulations be present they can be destroyed by chemical agents; the one most commonly used in the ear to-day is a solution of silver nitrate ranging in strength as high as 360 grains to the ounce. Chromic acid is also used.

Before using either of these agents, the parts to be cauterized should be cocainized, thus avoiding pain for our patient. If polypi are present, they can be saturated with a solution of cocaine or eucaine and adrenalin and be removed by the use of the curette or snare; and after their removal the base should be cauterized. In some of the cases where polypi exist, especially in our young patients, it is best to administer an anesthetic, in order to obtain a complete removal. After the canal has been cleared in this way and also in the ordinary cases of otorrhea we direct the patient, or whoever is to care for him, to irrigate the ear with a solution of bichloride of mercury one to 5,000 every two, three or four hours, as the case may be, depending upon the profuseness of the discharge. As soon as the discharge begins to diminish, then the frequency of irrigation should be lessened, as it is well to bear in mind that too frequent syringing of the ear lessens the integrity of

the tissues and serves to soften and make the parts flabby, thus preventing resolution from taking place. After we have cleansed the canal³ and just prior to stimulating the part, we should direct the patient to perform Valsalva's method of inflation, as this tends to expel from the middle ear, through the opening in the drum, any retained secretion. Should the patient be unable to do this, then gentle inflation, by means of the catheter, should be performed, and the secretion thus displaced should be removed before our final application is made to the surface we wish to stimulate.

After the discharge becomes less abundant and the patient is seen less frequently, a solution to be used at home can be prescribed, composed of the ingredients mentioned in a former paragraph, namely, boric acid dissolved in equal parts of alcohol and a one to 1,000 solution of bichloride of mercury. The patient is instructed to place from five to eight drops of this solution in the ear, morning and evening, after the cavity has been cleansed. This acts as a stimulant, and hastens the healing process. Later, as healing progresses, it should be used less frequently and finally dispensed with, when a firm cicatrix is formed. When the discharge is diminishing and after it has ceased, we can hasten resolution and improve the hearing by inflation and vaporizing the middle ear every other day, and later, once or twice a week; by this mode of treatment, the adhesions already formed are stretched, and the new drum surface is saved from any marked degree of contraction.

In cases where the perforation in the drum is on a level or higher than the short process of the malleus, we find a small amount of thin serous secretion, and if this persists in spite of all treatment, we can, in a large number of cases, bring about a speedy cure by the thorough cleansing of the middle ear by the use of the middle ear syringe, first injecting our sterilizing solution through the perforation until we are sure the cavity is clean, and then injecting an astringent solution sufficient to completely fill the tympanic cavity. The astringent most in use here is silver nitrate; and at first it should not be used stronger than five grains to the ounce; a solution of eucaine or cocaine can be injected into the cavity before the silver solution is used, and this will render it

much more comfortable for the patient. Stronger solutions can be used later should they be required. Zinc chloride has been used in this way, and also a two per cent. solution of protargol has been followed by rapid cures, the stimulating qualities seeming to act beneficially without the irritating properties of some of the other astringents.

As to the use of hydrogen peroxide in the treatment of this disease, there is a wide diversity of opinion. Some authorities report most brilliant results from its use; the claim is that when so used it clears out the small cavities by displacing secretion, which otherwise would not appear without the use of this agent. That this claim is well founded there can be no gainsaying; but I should hesitate to use this agent in the ear when the opening in the drum membrane is small, as the force exerted by the fluid might easily displace retained secretion, and carry it backward through the auditus into the mastoid antrum, and thus infect this structure. Were the perforation in the drum a large one, then I should not hesitate to use this agent, but a better and more stable one would be hydrozone. Enzymol in a 50 per cent. solution has received high praise as an adjunct in treating this disease. I have tried it in a number of cases, but with little or no improvement.

When the discharge is very persistent, and we have an area of exposed bone complicating the simpler condition, I have found the use of carbolic acid of very great value. The head is placed in a horizontal position and the canal partially filled with pure carbolic acid, and allowed to remain about 30 seconds, when the canal is syringed with pure alcohol. In this way the alcohol counteracts any escharotic action which the acid would have upon the normal tissues, and yet at the same time the diseased parts are thoroughly cleansed and stimulated. This procedure causes but little pain, as the patient experiences only a slight stinging sensation which quickly disappears. When after all the ordinary methods of treatment, a small perforation exists, with little or no moisture and the parts upon inspection look indolent, the method suggested and practiced by Blake, of fitting a very thin piece of sterile paper over the existing opening, will oftentimes heal the perforation. Flexible collodion applied over the

perforation will also bring about healing in a short time.

To improve the existing tinnitus after the otorrhea has ceased, we employ inflation and vaporization of tube and middle ear, and also administer strychnin in tonic doses, as well as small doses of the iodide of potassium. When we find upon examination intra-tympanic caries, no time should be lost in its removal, and if there has been no previous involvement of the mastoid structure, this removal can be accomplished through the external auditory canal. If, however, the mastoid shows signs of a previous involvement, or the amount of caries is so extensive as to preclude its complete removal through the canal, then a posterior opening should be made, and the radical operation performed, so as to throw the mastoid antrum, the cavity of the middle ear and the canal all into one. After this has been done, the application of a skin graft, taken from the thigh of the patient, and placed on the exposed area of the middle ear after the manner described by Ballance, will promote healing and give a rapid and permanent result. In cases of long standing suppuration with extensive caries within the tympanum, it is unwise to attempt removal through the canal, for in a small proportion of these cases, perforation has already taken place through the tegmen, and the irritation set up at this point by the manipulations within the ear will often cause disastrous results by a future extension through this opening.

Also in cases of long-standing suppuration, when the discharge has suddenly ceased, and the patient complains of an uneasy sensation about the head with pain, and accompanied with a slight rise of temperature, we should lose no time in promoting free drainage from the middle ear, and even, if necessary, open the mastoid; and many of these cases if so treated will show marked destruction of the osseous structure.

During the course of a chronic suppuration, the mastoid is liable at all times to infection, and should it become affected its opening is imperative at once in order that the deeper intra-cranial structures may not become involved. Should an involvement, such as an epidural abscess, thrombosis of any of the sinuses, or a subdural collection of pus take place, they should be treated at once on general surgical principles,

and all pus evacuated, and the diseased parts removed.

When facial paralysis has occurred in the course of a suppuration of the middle ear, we should lose no time in removing the pressure or ulceration which has caused it, and after this has been done, the interrupted galvanic current should be applied daily to that course of the nerve affected; massage of the affected muscles will also be of great benefit, and the internal administration of strychnin in full physiologic doses will hasten our cure. When a secondary labyrinthine involvement is present, the internal administration to the patient of pilocarpine muriate will often bring about a happy result. Potassium iodide and strychnine have also been used with markedly beneficial results in this condition.

When the discharge has ceased, in a certain number of cases we find the hearing much worse than while it was present. Upon inspection these cases show destruction of a large portion of the drum membrane, and the ossicles bound down by adhesions. We can often succeed in effecting a decided improvement in audition by dividing these adhesions, a procedure which can be quite easily carried out, after the discharge has ceased. When our suppurative condition is dependent upon, or complicated by syphilis or tuberculosis, the appropriate treatment for these conditions should be carried out aside from the local treatment of the middle ear.

As a word of warning in all cases of chronic suppuration of the middle ear, where necrosis of the bone is found upon our first examination, it is our duty to inform the patient of the danger to life if this condition be allowed to exist without removal of the diseased bone.

One word more and I shall have finished, and that is, in the cases coming under our observation for treatment during the earlier stages of this disease, we should never lose sight of the fact that they need a general and systemic building up in order that the local condition may improve the more rapidly, as it certainly will under properly directed treatment.

62 West Fifty-second Street.

XVII.

THE PREFERABLE ROUTE TO THE ACCESSORY CAVITIES OF THE NOSE IN THE TREATMENT OF CHRONIC AND OBSTINATE SUPPURATIONS.*

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The sinuses of the face and head (maxillary, frontal and sphenoidal) are grouped about the ethmoid, which is honey-combed with cells, all together forming the ethmoidal labyrinth. Sometimes infection attacks only one of these cavities (maxillary, frontal or sphenoidal sinusitis, or ethmoiditis); sometimes it attacks two simultaneously (combined sinusitis or polysinusitis); sometimes it invades all the cavities of one or both sides (unilateral or bilateral pansinusitis).

In the pre-rhinologic epoch "only *surgical sinusitis*, which manifested itself externally after penetrating the bony walls, was known, and it was uncommon. At the present time we are able to differentiate rhinologic sinusitis, which reveals itself in slighter symptoms, long attributed to chronic rhinitis; it is frequent." (Lermoyez).

No one doubts that the rhinologic form of sinusitis, discovered and diagnosticated at its appearance, requires only rhinologic treatment, that is to say, through natural openings, surgical measures being reduced to a minimum (catheterization, puncture, curettage). But suppurations tardily diagnosticated or tardily treated, or rebellious to rhinologic treatment are absolutely and will always remain (surgical sinusitis).

*From the *Annales des Maladies de l'Oreille, du Larynx, du Nez et du Pharynx*, Feb., 1902.

Rhinologists themselves cannot attack them other than by the ordinary methods of general surgery, that is to say, by entering them through natural passages artificially enlarged, with the aid of procedures derived from the general surgical therapeutics of suppuration in bony cavities (excision and free drainage).

It is exclusively to the study of these obstinate, chronic suppurations of the accessory sinuses of the nose, that this essay will be devoted, its object being a better operative technic. It purposely avoids simple sinusitis or ethmoiditis, either alone or combined; the diagnosis and treatment of which belong to the rhinologic domain, while pansinusitis belongs to rhinology for diagnosis but to general surgery for treatment. A preliminary matter to settle, before seeking the indications to be fulfilled, is to determine as precisely as possible the pathologic anatomy of the lesions to be treated.

Now, autopsies and especially biopsies, which have increased in number with the advance of surgical rhinology, show with regard to persistent suppurations: 1. That the lesions of the sinus mucosa are so deep that they may be considered irremediable. 2. That the ethmoid is always involved, not only with respect to its mucosa, but often also its bony structure, in lesions of sinuses which open into it or near it. 3. That suppuration persists or recurs as long as there remains a septic focus, unrecognized or forgotten, especially if there is insufficient drainage.

The diagnosis of these lesions is now possible, if not always easy, thanks to the progress of rhinology, and in this field the general surgeon should give way to the specialist, reclaiming his rights only at the moment of operative intervention.

Of course, the existence of deformity or *a priori*, a frontal, orbital or maxillary fistula is, so to speak, pathognomonic; but the diagnosis can and should be made before this far advanced period.

Anterior and posterior rhinoscopy furnish information of great value. The presence of pus in the middle meatus, the channel into which the maxillary sinus, the frontal sinus and the ethmoid cells open, points to infection of these cavities. Modification of the escape, accordingly as the head is held

erect or bent forward, permits differentiation of frontal from maxillary suppuration, the former emptying through an orifice from the lowest portion of the cavity, the latter by an opening so situated that it is lowest only in a particular position. As to ethmoidal osteitis, exploration with the probe will make the diagnosis. The presence of pus in the olfactory cleft, that is to say, between the middle turbinate and the septum, indicates suppuration from the posterior ethmoidal or sphenoidal cells; in these cases posterior rhinoscopy will show pus spread over the vault of the pharynx or the extremities of the superior and middle turbinates.

Exploratory puncture, followed by lavage, is applicable especially to the maxillary sinus, and sometimes the sphenoidal sinus.

Transillumination of the face—determining the permeability to light of the bony walls of the frontal and maxillary sinuses—shows opacity of the sinus involved.

From an exact knowledge of the lesions to be treated come the surgical indications to be fulfilled. It is indispensable :

1. To destroy the affected mucosa.
2. To curette away all bone involved.
3. To drain freely.

The reading of numerous clinical reports, most of which are collected in the thesis of Guisez, shows the importance of these indications.

All rhinologists who have operated upon or seen operations upon either sinusitis or ethmoiditis, have been surprised at the ease with which granulations reappear when any extent of diseased mucosa had escaped in the operation, however thorough the latter may have appeared. In the technic of all rhinologic operations for suppuration, curetting the mucosa is rightly considered one of the most important steps.

Excision of all the diseased bone is of still greater importance. Daily experience in general surgery shows this with respect to the large bones; rhinologic practice demonstrates it just as clearly with regard to the ethmoid. Whether this bone is removed bit by bit through the natural channels, by instruments as numerous as they are varied, or resected in masses with a curette introduced through an artificial opening, cure is obtained only (as is shown by the examination of

cases where successive operations were required) when all the involved bone is destroyed. It might almost be said that the duration of treatment is in inverse ratio to the amount of bone excised.

Finally, the importance of free drainage, very free, as free as possible, is capital, and leads all the other surgical indications. In general surgery the great value is well known of resection and drainage in crowded articulations—astragalectomy, for example, in articular infections of the tarsus. In the surgery of obstinate and diffuse suppuration of the accessory nasal sinuses, destruction of the ethmoid, the bond of union between the sinuses, is the end to be attained. We shall see, in discussing operative methods, how rhinologists have endeavored to secure such an excision of the ethmoid, which it is impossible to completely accomplish, but which they have never been able to make as extensive as they desired. Aside from a few circumscribed suppurations, of evident orbital origin, for which a simple orbital operation sufficed, as in several cases of Laurens', it is to be noted that among the numerous cases published, those that have been followed by rapid and permanent cure were those where nasal drainage, effected by excision of the ethmoid, was as free as possible. This is especially true of the upper cavities, the frontal and sphenoidal sinus and the ethmoid. As to the maxillary sinus, the importance of drainage is demonstrated by the fact that since the primitive proceeding of Caldwell-Luc, radical methods of cure of chronic empyema in the antrum of Highmore have given increasing consideration to nasal drainage, and have led to more and more extensive resection of the sinus wall.

It is possible to suppose even, without going too far in the way of deductions, that almost exaggerated drainage openings may, to some extent, make up for insufficiency of "surgical cleansing" of infected accessory cavities, sometimes so difficult to get at in all their recesses.

To sum up, the dominant surgical indications are two—excise the mucosa freely and especially diseased bone; drain the cavity as freely as possible.

In these chronic and obstinate suppurations, then, the ideal operation would be a "big operation." The importance of this is amply justified by the inconveniences and dangers

growing out of the affection it is designed to cure. Chronic pansinusitis poisons the existence of the patient; tenacious, fetid, abundant, finding exit through the nostrils or into the naso-pharynx, the suppuration discommodes and intoxicates the patient; to mental obsession is superadded a species of mild cachexia from slow, progressive intoxication. Besides, on the one hand, the orbit, and, on the other, the endocranium, are menaced by an invasion of the infection. As for orbital complications, of which an interesting review has been made by De Lapersonne in his report to the French Ophthalmologic Society in 1902, the number of known cases represents pretty accurately the proportion of these accidents. But as for intracranial complications, it is certain that in a number of cases the nasal or perinasal origin of the abscess, meningitis or phlebitis has escaped observers during the life of and even after the death of the patients. Further, whatever may be the proportion of these complications, their gravity is such that they justify, as a prophylactic measure, the most daring attempts at radical cure of chronic, obstinate suppuration of the perinasal bony cavities. The best operation would be that which, while exposing least to extension into the dangerous regions (neck and orbit), permitted an attack upon the infected cavities, to drain them freely and leave behind the fewest traces from an esthetic point of view, at the same time assuring a definite result, as good and rapid as possible.

What have been the routes followed by the numerous surgeons and rhinologists who have attacked these chronic diffuse suppurations?

They are very numerous and can be grouped in the following order:

1. NATURAL CHANNELS (NASAL FOSSAE).

It is through the natural orifice, the nasal fossa, that rhinologists at present operate upon the ethmoid. By reason of progress in the technic, now well marked out (Grünwald, Hajek), the ethmoid labyrinth may be freely opened through the nose. Unfortunately, it cannot be totally resected in this way. The most daring operators dread the proximity of the cribriform plate, toward which, by reason of anatomic

conditions, instruments introduced into the nose are persistently directed. Besides, even upon the cadaver, the operation is incomplete; it generally only reaches the anterior cells. Further, copious hemorrhage and frequent insufficiency of cocain anesthesia necessitate leaving some operations unfinished, which have to be repeated upon subjects who, unfortunately, become "because of nervous shock, less and less manageable, in proportion as the sittings are repeated"—(Luc). When success crowns the operator's efforts it is dearly bought. In fifteen cases of diffuse suppuration, Hajek obtained only three complete successes, and two required a year of attention.

The conclusion to be drawn from all this is, that the nasal operation is appropriate only for recent or circumscribed ethmoiditis.

By the nasal way it is possible to reach the maxillary sinus easily, after resection of the inferior turbinate, and open it as freely as necessary. Free drainage has become the indispensable complementary step of the bucco-nasal operation of Caldwell-Luc, and has gradually become more and more free. Perhaps some day it will be substituted for that operation, or rather constitute its only step. The hope is justified after the excellent success recently published by Claoue, of Bordeaux, who, as the chief feature of his method opened the sinus freely by way of the nasal fossa, following his own special technic.

As to the frontal sinus, it is not approachable through its floor, and the attempts made by this route, by Schoeffler and Winckler, have not been imitated.

Lastly, the sphenoidal sinus becomes accessible only after resection of the middle turbinate and sometimes of the ethmoid, and the proximity of the cribriform plate (which is menaced by any instrument introduced into the nose in an ascending direction, even obliquely backward) inspires wholesome fear.

The operation of Rouge, sublabial rhinotomy, which enters the nose through the mouth, by stripping the nasal pyramid upward from the labiogingival groove, is only a variation of the operation by natural routes, and gives a view little better than anterior rhinoscopy.

The same criticisms apply to the operations which strip up a portion of the nasal pyramid by the aid of cutaneous incisions—incision of the cartilage of the nose (Hippocrates), of the naso-buccal groove or the naso-labial groove, without section (Syme) or with section of the cartilage (Castex). The upper portions of the nasal fossae are inaccessible by these procedures, and the cutaneous cicatrix is an inconvenience without compensation by way of advantage. Hence, the natural route, that is to say, the intranasal route, is acceptable only on condition of its being enlarged or combined with another opening.

2. THE MAXILLARY ROUTE.

This is really a natural route, since the antrum of Highmore is entered through its intrabuccal aspect by most rhinologists. Through this path Goris has reached the ethmoidal labyrinth; Bardenheuer the frontal sinus; and Jansen, Luc, and Furet the sphenoidal sinus. Operation thus performed is difficult, only feasible for specialists very familiar with these regions, and, furthermore, usually is incomplete. Enlarging the maxillary route by total temporary resection, instead of simple trepanation, requires a preliminary general surgical operation, the utility of which is hardly demonstrated. If the preceding interventions do too little, the latter do too much.

3. THE ORBITAL ROUTE.

This leads through the os planum to enter the ethmoid cells (Knapp, Chipault, Luc, Gruening, Goris) and through the superior wall for the frontal sinus (Richter, Panas, Guillemin, Jansen). But if this route is not demanded by reason of a deformity or an orbital fistula it is dangerous for it opens a septic focus into the orbit; besides it displaces the pulley of the superior oblique, exposing the patient to diplopia.

4. THE FRONTAL ROUTE.

This has long been employed (Ollier, Panas, Rollet, Ogston, Luc, Kuhnt) for the treatment of suppuration in the frontal sinus. But surgeons and rhinologists recognize the impossibility of curetting all the ethmoidal labyrinth through the

floor of the frontal sinus, the posterior cells almost certainly escaping, and *a fortiori*, the sphenoidal sinus also.

5. THE NASO-JUGAL OR PARANASAL ROUTE.

We apply this term to the nasal route, enlarged externally by temporary or permanent enlargement of the anterior bony borders of the nasal fossae. Sometimes the enlargement of the pyriform orifice is made by the disease itself, as in the case of the patient operated upon by Chassaignac in 1854, who had planned a temporary resection which was not necessary to carry out. This is what probably occurred to the patient operated upon in 1890, by Quenu, where the sphenoidal sinus was easily entered by following the opening made by the pus.

But, in general, the enlargement should be made by the surgeon. What is the most obstructing part, resection of which, consequently, is of the greatest importance?

Examination of the anatomic structure and study of operations proposed or executed upon the cadaver and the living show that the intrinsic bones of the nose play a capital role in this region from an operative point of view. Instinctively, a number of surgeons since Michaux de Louvain (1843) have attacked them (Chassaignac, Ollier, Gussenbauer, Boeckel, Chalot, Rafin, Moure, Killian) to open a path to the ethmoid, but they have perhaps not sufficiently emphasized that this resection is the key to a well-ordered and complete operation. The apophysis of the superior maxilla may be treated by the surgeon like the nasal bones, but it is of far less importance than the latter. In fact the apophysis corresponds to the middle portion of the nasal fossae, larger and less dangerous than the upper portion, corresponding to the nasal bones.

Among surgeons, some have performed permanent resection of the bony border of the pyriform orifice, for example, Taptas and Killian for suppurative fronto-ethmoiditis, and Moure for tumors of the ethmoid. Most of them—and this after the first operative trials—have advised or done temporary resection (Chassaignac, Langenbeck, Ollier, Boeckel, Lawrence, Bruns, Gussenbauer, Rafin, Chalot).

6. COMBINED ROUTES.

These have been planned either in advance as an operative method, or extemporaneously to fulfill the unforeseen necessities of an intervention.

The ethmoid always being involved in chronic, diffuse infection, and its lateral masses being concealed by the nasal bones, the naso-jugal or paranasal route is always necessitated. If the frontal sinus is involved it becomes, combined with the frontal route, the naso-frontal route, for which Killian has recently mapped out a careful technic, insisting upon the importance of freely excising the ethmoid. If the maxillary sinus of the same side is diseased, it suffices to prolong the cutaneous incision and resection of bone downward to open a large fronto-naso-maxillary opening.

If the lesions are bilateral we would have, analogous to the foregoing, the following routes: 1. Bi-naso-jugal route. 2. Bi-fronto-naso-maxillary route. The nose may be turned aside in a cutaneo-osseous flap upon a hinge which may be either inferior (Chassaignac, Ollier, Gussenbauer), or superior (Lawrence), or lateral (Langenbeck, Boeckel, Bruns, Chalot). The first method renders the upperportion of the nasal fossae more accessible, the second gives more room below, and the third gives access to all the nasal fossa opposite the hinge, and the upper part of the other nasal fossa. Each of these methods of intervention may then have its particular indications.

7. THE ROUTE PROPOSED.

The route which we propose, after having experimented upon the cadaver, and applied it successfully in a case where nasal suppuration had resisted intervention by the alveolar route for the maxillary sinus and by the frontal route for the frontal sinus, is, we will say, that which appears best fitted for unilateral, obstinate pansinusitis.

The technique which we advise is not advanced as a new procedure. Original in its ensemble rather than its details, it is designed only to co-ordinate and simplify—in a word, regulate—this surgical intervention.

A. PRELIMINARY STEPS.

The most important is anesthesia. General anesthesia is indispensable. It should be done with chloroform, with the aid of a mask or compress, before the operation. During the operation the chloroform should be given upon a sterilized gauze tampon held with forceps under the nostrils or over the mouth of the patient. Preliminary anesthesia with cocain is useful in dulling the reflexes.

Preventive hemostasis of the nasal fossae is hard to secure. With adrenalin (applications of a 1 to 2000 or 3000 solution) it can be obtained in this region almost as thoroughly as by the use of the Esmarch band on the limbs. In the absence of this agent or in case of its insufficiency, long strips of gauze, pushed as far back as the pharynx, will assure, if not a preventive hemostasis, at least protection of the air passages from blood. Rose's position can be employed for this purpose, but it congests the entire operative field.

B. EXTRA-NASAL OPERATION.

1. *Cutaneous incision* in the form of a 7 (or reversed 7, according to the side, right or left). The horizontal branch is in the eyebrow; the vertical follows first along the internal border of the orbit, then the groove made by the nose and cheek. Incise to the bone in the vertical but not the horizontal part of the incision.

2. *Stripping the periosteum*.—In the vertical branch of the cut, elevation with the rugine of the internal lip should stop at the lacrymal sac in the orbit, and on the cheek at a point corresponding to the root of the canine tooth prolonged. In the horizontal incision, with two strokes of the bistoury, making an arc concave above and one concave below, cut the border of the orbital base, then liberate it above and below the orbital border, near the beginning of the eyebrow only, and lay bare the fronto-nasal suture and the suture of the frontal with the lacrymal bone.

3. *Opening the frontal sinus*, by the frontal route (above the fronto-nasal suture) or by the orbital way (above the suture of the frontal with the lacrymal), or both combined, according to the form and extent of the sinus and the nature

of the lesion. If possible, do not cut the mucosa, which bleeds very freely within and without.

4. *Resection of bone, temporary or permanent.*—If the resection is to be permanent, it is made more rapidly with the rongeur forceps, beginning at the border of the pyriform orifice. The bone is brittle enough laterally, very hard superiorly. In this proceeding the operation inevitably opens the nasal fossa largely.

If the resection is to be temporary, which is preferable, it is necessary to mark out the line of bone section. This should be done with the perforator at the following points: fronto-nasal suture; fronto-maxillary suture; pre-canine depression. These points should be united, either with the electric saw or simply the chisel and mallet. Another stroke with the chisel will separate the suture uniting the two intrinsic bones of the nose.

C. INTRANASAL OPERATION.

1. *Liberation of the enlarged pyriform orifice.*—Turn back the nose to the opposite side, after cutting the nasal mucosa, and, after tamponing, explore by sight and probe the interior of the nasal fossa. Good electric illumination is indispensable.

2. *Ethmoidal Curettage.*—The middle turbinate, easily to be seen in its entirety, is grasped near its insertion and cut or torn away. A grooved director is inserted close to the fronto-nasal suture, parallel to the cribriform plate, thus protecting it. The curette is then used to scrape away the lateral mass of the ethmoid, maneuvering from above downward and from without inward, that is to say, away from the dangerous points (the cribriform plate and the os planum) toward non-dangerous ones. The anterior and posterior cells are all accessible by this method.

3. *Sphenoidal curettage.*—The ethmoid being removed, it is sufficient to push the tip of the grooved director into the depths; it goes directly to the anterior wall of the sphenoidal sinus and breaks into it; the curette, guided by the director, enlarges the opening and clears out the sinus.

4. *Fronto-nasal curettage.*—Through the frontal or orbital breach the frontal sinus is quickly curetted, then the

floor is freely opened into the nasal fossa. Do not stop until "a large communication between the nasal cavity and the frontal sinus is permanently assured."—(Killian.)

5. *Naso-maxillary curettage*.—Resect at least the anterior half of the inferior turbinate. Pierce the nasal wall of the sinus with a gouge and excise it as widely as possible, especially at its middle and inferior portions. Through this wide breach, curette the sinus.

These intranasal steps can and should be executed with rapidity, by reason of the hemorrhage which ceases only when the healthy, and especially the diseased, mucosa has been excised or curetted. Their execution will be considerably facilitated by the employment of adrenalin.

D. SUPPLEMENTARY STEPS.

1. *Hemostasis*.—Moderately forcible tamponing with at least three strips of gauze, one naso-frontal one nasal, one maxillo-nasal. Ligature or torsion of the cutaneous arterioles.

2. *Suture*.—After replacing the nasal pyramid and coapating the resected bony fragments, careful cutaneous suture.

3. *After-treatment*.—Remove the gauze after 48 hours. Lavage ad libitum or if intra-nasal infection is feared. Removal of cutaneous sutures between the eighth and tenth days.

E. PROGRESS.

The operative sequelae should be trifling. The thermometer will vary from 37 to 37.5 degrees C. Locally, the skin will unite rapidly, the bony callus will form for three weeks, at first a little exuberant, then diminishing in size. If there was excision of bone a slight depression will remain near the inner canthus of the eye. The nose secretes mucus at first, then abundant, clear mucus, the secretion finally becoming normal.

It is possible that some fever may ensue. The temperature may go above 37.5 and go nearly to 38 in the evening, during the first few days while the debris of the diseased tissue is being eliminated, having been detached but not removed by the

operation. Nevertheless the general condition is reassuring in spite of the tendency to pyrexia. Sometimes, also, there is a small scale of detached bone which necroses and its elimination is accompanied by a transitory fistula.

As for true post-operative accidents of septic origin, they are the less probable in proportion as the incision has been large, in other words, as the drainage is free.

Rapid progress to permanent cure is the rule, according to Killian, in cases operated by the fronto-nasal method, the technic of which he has published. Our operation done several months before Killian's publication, was inspired by the same principles as were the interventions of this surgeon. It was likewise followed by rapid and permanent cure.

PERSONAL OBSERVATION (PICQUE AND TOUBERT).

M. C., aged 44 years, an employe of the Asiles de la Seine, was attacked in 1901 with suppuration of the right maxillary sinus. The sinusitis was treated by M. Laurens by alveolar puncture and lavage; it was cured in a few weeks.

In February, 1901, the patient complained of frontal headache and intermittent nasal suppuration, somewhat abundant. Trepanation of the anterior wall of the frontal sinus was done by Picque; the sinus was drained through the incision. The wound remained fistulous after removing the drain, and the patient continued to suppurate and suffer until the beginning of May. On May 1, Toubert, being called to examine the patient, made a rhinoscopic examination.

General condition.—Satisfactory. However, the patient suffers, is uneasy and unfitted for continuous work because of constant headache with slight intermittent vertigo, and especially because of profuse nasal suppuration.

External examination.—Cutaneous fistula leading into the right frontal sinus. No facial or palatal deformity.

Anterior rhinoscopy.—The right nasal fossia is coated with very thick mucus, especially over the turbinate and in the middle meatus. No pus visible when the head is erect; but when the patient remains 10 or 15 minutes with the head bent strongly forward pus appears in the naris in large drops, and an examination with the speculum shows that the pus issues from the middle meatus. Exploration with a blunt

probe reveals friability of the ethmoid, which has been softened by suppuration; the denuded bony lamellae are felt to crumble under even light pressure.

Posterior rhinoscopy.—Pus in flakes on the vault and on the extremities of the superior and middle turbinates.

Exploratory puncture of the maxillary sinus.—Made through the inferior meatus, at the point of election, with Lichtwitz's trocar and followed by lavage. No pus discovered.*

Conclusions.—(a) Right frontal sinusitis, opening externally and without communication (or, rather, insufficient communication for drainage) with the middle meatus.

(b) Anterior and posterior right ethmoiditis, with, possibly, involvement of the sphenoidal sinus.

(c) It is probable that the right maxillary sinus is no longer infected, but that it serves intermittently as a reservoir for pus coming from the frontal sinus, perhaps, and certainly from the ethmoid.

Indications for operation.—First, to suppress the focal ethmoidal osteitis and follow up the necrosed parts even to the sphenoid if necessary; second, to transform the external fistula of the frontal sinus into an internal fistula by taking away the floor of the sinus and by autoplasty of its anterior wall; third, preventive drainage of the maxillary sinus through the nose, by freely opening its internal wall at its lowest portion.

Operation.—After several trials upon the cadaver, this was done May 6 by Toubert, to whom Picque entrusted his patient, in the operating pavillion of St. Anne's Asylum, with the assistance of L. Picque, R. Picque and Dagonet, who administered the anesthetic.

The preliminary steps were executed as in the typical operation previously described, with the exception that adrenalin was not employed.

The cutaneous incision was rectangular, inclined down-

* Examination of the sinus by transillumination could not be made. But, by reason of the fistulous condition of the right frontal sinus, it was useless for this cavity, for the maxillary sinus puncture furnished sufficient proof. As for the ethmoid, transillumination would not show the state of the labyrinth.

ward and outward instead of 7 shaped, because of the pre-existing frontal incision which was vertical. The step of opening the frontal sinus was unnecessary because of the previous operation. Temporary resection of the nasal bone and the maxillary apophysis of the right side was done with the perforator and chisel. The intranasal operation was done as described above. Hemorrhage was abundant, almost alarming, during the latter step. It ceased spontaneously as soon as the curettage was finished. The operation lasted thirty minutes, sutures included.

Tamponade and drainage through the nostril. Subcutaneous injection of artificial serum. Extraction of gauze on the third day and of the sutures on the eighth. Union throughout, except superiorly, where the edges of the old frontal sinus fistula had been freshened, and near the unguis.

Headache ceased after the second day; the purulent discharge was replaced at first by the expulsion of clots, then by a rather abundant hydrorrhea which continued nearly three weeks. Exeat.

At the beginning of June, one month after intervention, the patient was again seen. The face has resumed its normal aspect, excepting the frontal scar which is depressed; the suture line is almost invisible; a small sequestrum had been extruded near the lacrymal bones. By anterior rhinoscopy the nasal fossa is found to be much less enlarged than might be supposed: its appearance resembles that of atrophic rhinitis. The mucosa is pale, of a cicatricial aspect, barely moistened with mucus; no crusts, no pus. The handkerchief of the patient has no purulent spots on it. The secretion of pus, which before operation was so annoying as to prevent working when the head was bent forward is entirely stopped. The patient has neither headache nor vertigo; he is again happy and manifests his satisfaction at being cured.

* * *

The proposed operative technic appears to us to present a maximum of advantages with a minimum of inconveniences.

The sole drawback is the fear of a visible cicatrix. This fear has been exaggerated. Since the first operations, those of Chassaignac and D'Ollier, for example, done in the pre-antiseptic period, the cosmetic result has been observed to be

satisfactory. With asepsis still better can be done. What disfigures the patient is not so much a cicatricial line, which is nearly always concealed, for that matter, in the eyebrow or naso-jugal groove, as a depressed scar like those left by a large abrasion of the anterior wall of the frontal sinus (Kuhnt's procedure). Free drainage of the frontal sinus by free excision, so to speak total, of the ethmoid permits a reduction to the minimum of the frontal or fronto-orbital trepanation, on the well-understood condition of sparing the orbital arch, which surgeons nowadays, Jansen and Killian in particular, endeavor to preserve intact.

The patient upon whom we operated declared himself very well satisfied, in spite of a depressed, vertical, frontal cicatrix, which proves that these patients do not consider the cure too dear, even at the expense of slight deformity.

Even if excision of the nasal bones and the ascending portion of the maxillary has been done, the subsequent deformity is still slight, since Moure who employed this method for the extirpation of tumors in the ethmoid, declares that "there is rarely a little depression at the inner angle of the eye," and concludes that "the cosmetic result is perfect and fronto-orbital trepanation and excision of the nasal bones proper," likewise affirming that he has been able to cure his patients without disfiguring them. His results have been confirmed by Luc quite recently.

With these reservations from a cosmetic point of view, and they are of little importance, the proceeding which we advise offers advantages only.

First. The operation is rapid. Despite incomplete experience, we were able to finish^{four} our operation in thirty minutes. If it had been a bilateral pansinusitis we would very probably have been able to terminate it in forty-five minutes. Luc, whose experience in the matter is considerable, declares that he devoted three hours to the radical cure of one case of this sort, and hence advises taking account "possible fatigue of the operator."

Second. The operation was done at one sitting and this was greatly appreciated by the patient, who had undergone operations by natural routes and desired an ending of the matter.

Third. The intervention demands no special apparatus except good illumination—the electric light. Bistoury, mallet, chisel, curettes and grooved director are sufficient.

Fourth. It is easy for every surgeon, even those who are not also rhinologists. Free opening of the nasal fossa makes the most complex operative step the most simple, and while the conditions required according to Killian, “profound knowledge of the frontal sinus and ethmoid, close study of dry and fresh specimens, and repeated operation upon the cadaver,” are not without value, they are not absolutely indispensable “to those who desire to treat these cases with success and avoid failure.”

Fifth. The operative results are simple and do not demand rhinologic treatment afterward. The larger the operation the greater is the chance of avoiding either persistence or recurrence of suppuration, quite frequent after incomplete operations, judging by the number of cases collected by Guisez, or the phenomena of retained catarrhal fluid, even if non-septic as in Luc’s case, previously operated upon by Schwarz.

The conclusions to be drawn from the reported cases, in which the most varied treatment has been tried, are the following:

1. The surgeon should not intervene until after calling upon the resources of rhinology for diagnosis, that is to say, after establishing the probable pathologic anatomy of lesions which, by reason of their extent and depth, would be inaccessible to petty surgery of the nasal fossa.

2. It is necessary to operate by attacking obstacles directly, conforming to the principles of real surgery, which is “open surgery.” There is thus substituted for a delicate, difficult, sometimes dangerous, operation, one that is well defined, rather easy, harmless and effective.

3. The results obtained seem to be more satisfactory both for the patient and for the surgeon, who will thus have acted *cito, tuto et jucunde*.

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ABSTRACTS FROM CURRENT OTOLOGIC, RHINO- LOGIC AND LARYNGOLOGIC LITERATURE.

I.— EAR.

The Electro-Catalytic Treatment of the Ear.

URBANTSCHITCH (*Monatsch. f. Ohrenh.*, November, 1902) for many years has used the constant current in the treatment of the difficulty in hearing remaining after otitis media purulenta and chronic catarrh. He based this on the fact that at the cathode there were an increased blood and lymph current and chemical changes. At the anode a hard and at the cathode a soft cicatrix arises. He used for the ear a screw like electrode, wound about with moist cotton. The cathode is placed in the ear, the anode in the hand. The drum and labyrinth wall will stand usually only 1-10 to 2-10 miliamperes. Otherwise there will be dizziness and pain. The current must be gradually increased, and diminished. The author reports 10 cases (18 ears), treated some for months at a time. In 6 ears, that is a third of the cases there was an improvement, either of hearing or subjective noises or both. In all cases, the ordinary methods were without results. In a few cases, suppuration appeared.

Levy.

Are There Anastomoses Between the Vessels of the Middle Ear and those of the Labyrinth.

T. BRAUNSTEIN and G. BUHLE. (*Arch. f. Ohrenh.* Bd. 56.) By means of experiments undertaken by both authors separately, it was shown that, contrary to Politzer's belief, the vessels of the middle ear entered the promontory but not the labyrinthine capsule.

Levy.

The Influence of the Radical Operation on Hearing.

BUHE. (*Archiv. f. Ohrenheil.*, Bd. 56.) The author, with this in mind, examined the material of the Halle clinic since the year 1894, in all 112 cases. He insists that the results in the different clinics should not be compared so long as there is no standard method of examination. Nine cases were deaf before and after the operation; of the others, 34 per

cent. were bettered, 36 per cent. remained the same, and 30 per cent. became worse. A considerable bettering of the auditory nerves was achieved only when the chain of ossicles was diseased and the labyrinth intact. If the hearing before the operation was w. at 1 m., it usually became worse. Pus did not show a demonstrable influence. *Levy.*

The Site of the Reflex Center for the Musculus Tensor Tympani.

HAMMERSCHLAG. (*Arch. f. Ohrenheil.*, Bd. 56.) Experimental sectioning succeeded in proving that the reflex center for the tensor tympani lay in the medulla oblongata. In the cat, the upper limit lies immediately behind the posterior corpora quadrigemina, and the lower limit at the beginning of the lower third of the medulla. *Levy.*

Deaf-Mutism in Relation to Observations of Aurists.

BEZOLD. (*Bergman's Verlag.*, Wiesbaden, 1902.) In the 34,000 cases of ear diseases treated by the author, there were 456 deaf-mute, i. e., 1.3 per cent. He divides his findings into 12 heads, 51 per cent. acquired, 43 per cent. congenital deafness, 6 per cent. doubtful. In 45.9 of the congenital, and 21.5 per cent. of the acquired deafness, there were remains of hearing for speech. The time of the becoming deaf, sex, heredity, near relationship of parents, drinking, idiocy, etc., are discussed in detail. 4 cases were caused by measles, mumps and diphtheria, 13 by hereditary lues. The author designates his work as the forerunner of a large collection of statistics. *Levy.*

Various Operative Procedures for the Relief of Chronic Suppurative Otitis Media, and Their Comparative Value.

EDWARD B. DENCH, New York. (*American Journal of the Medical Sciences*, Nov., 1902.) Ossiculectomy and the radical operation for the cure of suppurative otitis are the procedures considered; and the details of the operation are given in each instance. The author's later experience has led him to believe that conservative surgery for chronic otitis is a mistake rather than an advantage; and he thinks that the field of the operation of ossiculectomy will become more and more restricted as the experience of the surgeon widens.

Of the cases of suppurative otitis subjected to ossiculect-

tomy the statistics show that in about one-half recovery has been complete.

He regards the removal of the incus as an essential part of the operation, and says that it ought to be hunted for even though considerable time is taken, and the operator should be absolutely sure that it has been removed before considering the operation of ossiculectomy finished.

In the case of radical operation, he believes in a thorough and complete operation, so as to remove every bit of diseased bone, going as far in every instance as may be necessary to do this, even though the dura or the lateral sinus be exposed.

So far as the published statistics go, the results of the radical operation are not as yet very much better than for the operation of ossiculectomy, although the author's personal statistics for the radical operation are much better than for ossiculectomy.

As to the choice between the two, the simpler procedure may be resorted to where the caries is limited, and where there is no history of recurrent attacks of acute inflammation of the middle ear. Where, however, there is a history of recurrent attacks of acute inflammation in the course of purulent otitis, and where these acute attacks are accompanied by symptoms which make one suspect that these may be beginning infection of the mastoid, labyrinth or intracranial structures, the radical operation should invariably be chosen.

The important question as to the effect of these various operations upon the hearing is considered. In the author's own experience, ossiculectomy has seldom reduced the hearing but has in many cases improved the power of audition. As to the radical operation, he does not believe that the surgeon is warranted in promising the patient that the hearing will be as good after the operation as before, unless the power of audition is very much diminished in the affected ear at the time of operation.

As in many of these cases the preservation of the function of hearing is not of as much importance as the question of danger to life from the suppurative process, the question of hearing in many cases may be disregarded, and that operation done which seems, all things considered, to be the most suitable to the individual case.

Richards.

**Purulent Phlebitis of the Sigmoid Sinus without Thrombosis:
Death from Meningitis; Autopsy.**

ARNOLD KNAPP, New York (*Archives of Otology*, Vol. XXXI, No. 5), summarizes thus:—A patient with unquestioned pyemia of aural origin, having 2–3 chills a day, at operation presented an enormously distended sinus with a thin but healthy anterior wall; the sinus contained fluid blood. The sigmoid sulcus was normal. The bone posterior and external to the horizontal semicircular canal seemed unhealthy, and the neighboring dura was covered with apparently healthy granulations. The pyemic condition, though improved at first, continued; the swelling in the right suboccipital triangle became circumscribed. At the second operation the floor of the occipital bone was explored to no purpose, and as the bone near the labyrinth seemed unhealthy this was further resected. No new lesion found. The lateral sinus still contained fluid blood. The jugular vein was ligated. The patient's condition grew steadily worse; meningitis became more marked, and led to the patient's death.

At autopsy, meningitis was found, the descending portion of the sigmoid sinus was enormously distended; the anterior wall was very thin but healthy. The posterior wall measured 6 mm.; all coats of the venous wall were infiltrated, the central part red and the part projecting into the lumen gray and rough, apparently necrotic. This infiltration extended down through the bulb to the beginning of the jugular vein, thus producing the deep suboccipital induration. The cerebellar surface of the dura appeared healthy. The sinus contained a recent blood-clot. *Campbell.*

Otitic Brain Abscess: Report of Two Cases.

GEORGE F. KEIPER, Lafayette, Ind. (*Jour. Amer. Med. Assoc.*, Mar. 21, 1903). Two cases are reported, both subsequent to chronic suppurative otitis. In the first case there was high temperature with remissions and the abscess was in the temporosphenoidal lobe. It was drained, but death occurred six days later.

In the second case the first attempt to find the abscess was unsuccessful. Eighteen days later the patient became unconscious, the wound was re-opened, a bulging dura found,

and an aspirator located the pus. A drainage tube was inserted and recovery took place without untoward incident. The wound had to be re-opened once and a little more bone removed so as to improve the drainage. Asphagia was very marked. Recovery has been complete. *Richards.*

Electrolysis in Eustachian Salpingitis with Stricture; Report of 75 Cases.

ELLWOOD MATLACK, Philadelphia (*American Medicine*, Feb. 7, 1903), has used eustachian electrolysis in 75 cases, during one year; not selecting his case, but using it in every deaf person applying for treatment that was willing to submit to it. Some of his patients had been deaf for 20 to 25 years; in others the trouble followed various systemic diseases; and some presented cicatricial conditions following old otorrhea. Very few were typically favorable cases in which the pathologic changes were confined to the tube. The symptoms usually associated with eustachian obstruction, that is, deafness, with a sense of fulness in the head and varying abnormal sounds, were almost invariably relieved or cured in cases in which eustachian obstruction seemed to be the cause, and he thinks that this cure will remain permanent provided the nasopharynx is kept in normal condition.

In one case of a man of 34 years the deafness had been increasing since childhood, and the voice could only be heard when much intensified. There were cicatrices in both tubes. On the restoration of the normal caliber of the tubes the hearing while not normal became sufficient for all ordinary occasions. Another patient was able to discard the use of the hearing trumpet.

In seven cases of aural sclerosis without marked tubal obstruction but with secondary involvement of the auditory nerve, electrolysis was unsuccessful.

Occasionally a little temporary swelling of the tissues has followed the withdrawal of the bougie, sometimes lasting several hours and accompanied by an increase of deafness and other symptoms.

The current should be used only once a week. The best results are obtained in connection with any other measures

that have been found of service in the pathological conditions present.

Excluding purely labyrinthine conditions, the author regards electrolysis of service in almost all other forms of deafness, and especially in cases of moderate degree, in which the most pronounced changes are in the tube.

"The current used varied in strength from one to five milliampères, and was obtained from an ordinary galvanic battery, the positive (sponge) electrode being held in the hand of the patient, and the negative (gold-tipped wire) passed through an insulated eustachian catheter for about 35 mm. into the middle ear cavity. The duration of treatment was one minute or less as a rule. The bougie, after one or more applications, gradually overcomes the resistance of the stricture, and finally enters the tympanic cavity and there moves freely. Successive sizes are passed until the tube has resumed its normal caliber. This result can be secured in the vast majority of cases, but not in all."

The instruments and the nasal cavity should be made as aseptic as possible, and with care little inconvenience will be felt by the patient.

In one case after application a slight emphysema of the face, lasting a few hours, followed; and in another instance an acute otitis media developed during the course of the treatment, but the author thinks this latter was probably due to influenza.

Richards.

The Value of Bacteriologic Examination of the Discharge in Acute Otitis Media as Determining the Necessity of Operative Interference.

EDWARD B. DENCH and FRANK M. CUNNINGHAM, New York. (*Transactions of the American Otological Society*, 1902.) As a result of studies made at the New York Eye and Ear Infirmary, the conclusions are reached that in obscure cases much can be learned from a careful microscopic examination of the discharge from the ear. There must necessarily be in every case of purulent inflammation of the tympanumsome involvement of the mastoid antrum. At the very onset of symptoms of mastoid involvement the local application of cold to the mastoid is justified. The external auditory canal having first been sterilized, free drainage from the

middle ear should be secured by an extensive incision of the drum membrane, this incision being carried upward on the upper wall of canal for a considerable distance in order to relieve tension in the mastoid antrum. After such incision has been made the canal should be irrigated frequently with 1-5,000 bichloride of mercury. Local application of cold should not be persisted in longer than 48 hours and usually not more than 36 hours. Whether the inflammatory process will extend depends upon the character of the infection. In all cases of streptococcus infection, there was a tendency for the inflammatory process to extend rapidly to the osseous structures, and when this has occurred the only possible way of effecting a complete cure is by the evacuation of the pus by thorough operation. In those cases in which the free incision of the drum membrane and the local application of cold had produced abortion of the acute symptoms, the diplococcus pneumoniae was the organism found in the discharges.

In those cases of pneumococcus infection, with three exceptions, in which operations were performed, the mastoid was less diseased than was the case when any other infectious organism was present; so that the author regards the presence of the pneumococcus as the sole etiological factor significant of a rather mild form of inflammation in the mastoid cells.

In the case of streptococcus infection, the rate of progress of the inflammatory process is very rapid; in many cases in which the inflammatory process had existed but from 48 to 72 hours there was extensive destruction of the bone. The use of ice in cases of streptococcus infection is absolutely unwarrantable, and the author thinks it unwise in case of streptococcal infection to endeavor to abort extension of the inflammatory process. If free drainage and absolute cleanliness do not cause the mastoid symptoms to disappear at the end of 48 hours, immediate operation is demanded.

In cases of mixed infection, in which the streptococcus is present, the majority of cases will require operation.

Richards.

Case-Book Record of 183 Operations on the Mastoid Bone.

LEVI JAY HAMMOND, Philadelphia, Pa. (*Phila-*

delphia Medical Journal, Jan. 31, 1903). Of the 183 cases 37 were operated on for chronic sup-puration from antrum and attic, while 103 were mastoid cases in which the present attack was the first ear trouble complained of. There were 12 cases of Bezold mastoiditis. After operation on the antrum and attic the average period of convalescence was five weeks, and in the cases associated with chronic suppurative otitis, it was five and three-tenths weeks. *Richards.*

The Surgical Anatomy of the Middle Ear; A Factor in Favor of Early Interference in Suppurative Affections.

EMIL AMBERG, Detroit, Mich. (*American Medicine*, Nov. 15, 1902.) Various cuts from the author's dissections are shown and the following anatomic points considered:

1. The tympanum, epitympanum, aditus ad antrum, antrum and mastoid cells form one cavity, connected with the pharynx through the eustachian tube.

2. The floor of the tympanic cavity and the floor of the mastoid antrum do not form one smooth plane with each other but are separated like to valleys; hence the middle-ear suppuration involving the mastoid antrum and mastoid cells may come to a standstill so far as the tympanic cavity is concerned, and yet the process go on in the antrum.

3. The mastoid cells lie in all directions from the antrum; hence the necessity of thoroughly investigating every diseased portion.

4. The three ossicles of the middle ear serve to make the epitympanic space and the tympanic cavity uneven and complex.

5. The roof of the epitympanic cavity is very thin.

6. The lateral sinus is imbedded in the mastoid cells without having a firm protection,

7. The facial nerve is sometimes imperfectly protected.

8. The bulb of the jugular vein is separated from the floor of the tympanic cavity by a thin layer of bone only.

9. The carotid artery is so located that caries of the lower floor and inner wall of the tympanic cavity can extend to it.

10. The relation of the inner ear to the middle ear and to the cranial cavity is a close one.

In early years the petrosquamosal fissure runs the whole length of the tegmen tympani.

In old suppurative cases the sclerosis of the outer wall of the mastoid process may cause the pus to work its way to the points of least resistance, frequently obscuring the symptoms.

Richards.

A Case of Scotoma Auris Partiale Centrale et Periphericum.

EMIL AMBERG, Detroit, Mich. (*Jour. of A. M. A.*, Jan. 17 & 24, 1903.) The patient was 40 years of age and suffered from otitis media catarrhalis chronica. She stated that she could hear a clock at home when it was in a position upward from her right ear but could not hear the same clock at the same distance from the ear when it was on a level with the ear. On examining her with the watch it was found that at a distance of three and three-quarter inches it was heard at a height corresponding to the top of the auricle, whereas it was not heard at the same distance directly opposite the canal or below it.

The cause of this condition the author thinks to be the conformation of the concha and meatus, and he names the phenomenon: "Scotoma auris partiale centrale et periphericum."

Richards.

The Anatomy of the Carotid Sinus.

H. HAIKE. (*Arch. f. Ohrenheilk*, Bd. 57.) The sinus caroticus was studied by the author with an injection apparatus. It was thus seen that the carotid in its ascending and horizontal part was surrounded by a thick network of veins, while the knee was almost free. The appearance of a sinus similar to the sinus cavernosum occurs late in life, by the fusing of the large twigs. For this, the term plexus is better. The clinical importance of the sinus arises from the fact that the venae carotico-tympanicae run to the middle ear, and sinus wall is a continuation of the dura. A hemorrhage from the sinus can sometimes be mistaken for one from the carotid.

Levy.

The Performance of the Radical Operation Under Schleich's or Local Anesthesia.

G. ALEXANDER reported (*Arch. f. Ohrenheilk*, Bd. 57.)

in an earlier publication 11 cases of acute mastoiditis operated under Schleich's anesthesia. He has carried out the radical operation 3 times under Schleich's anesthesia. He finds that the evacuation of the contents of the middle ear and the antrum with the sharp spoon, and the cleaning of the ostium tympanicum tubae was not without pain. Therefore Schleich's should be used in radical operation only when narcosis is strictly contraindicated. *Levy.*

Treatment of Acute Purulent Otitis Media.

E. J. MOURE, (*Journal de Medicine de Bordeaux*, May 25, 1902.) Treatment of acute otitis media may be divided into two periods, first that preceding the suppuration, when the exudate is serous, sero-purulent or hemorrhagic, second the suppurative period. In the first stage if the pains are not too severe the object of treatment should be to bring about a resolution of the exudation, and avoid perforation into the tympanum.

In the second stage, the membrane should be immediately incised, and hot fomentations applied, to facilitate a discharge of pus. Hot douches may be used two or three times a day, and may be accompanied by sprays into the nose of an oily solution of boric acid and menthol. The author advises against inflations of air into the ear by any method as dangerous, since they favor the introduction of septic germs into the naso-pharynx. *Goodale.*

Sequestrum Comprising the Internal Auditory Meatus, the Superior and Posterior Semicircular Canals, and the greater part of the Vestibule.

DR. HUGH E. JONES. (*Jour. Laryng. Rhin. Otol.*, Feb., 1903.) The sequestrum had been removed from a patient, aged twenty, a subject of hereditary syphilis and suppurative otitis media from infancy, with double facial paralysis.

Two years ago the complete post-aural operation had been performed on both sides. Recently there had been recurrence of suppuration in the right ear, the left remaining quite sound.

In July, 1902, the sequestrum shown was removed by post-aural incision, and the cavity grafted with partial success.

September 30.—Hearing: right, nil; left, fork very slightly both B.C. and A.C.

On November 14, the patient was doing well, with some return of power in the right side of face.

Portions of Temporal and Adjoining Bones (right side with Malignant Growth the size of a Walnut Springing from the Tympanum, and Invading the Under Side of the Temporo-Sphenoidal Lobe.

E. DEANSLEY. (*Jour. Laryng. Rhin. Otol.* Feb., 1903.) There was a history of aural discharge and slight deafness ever since scarlet fever in boyhood. In October, 1901, he began to have frontal headache, giddiness, and progressive loss of vision. He applied for treatment March, 1902, and was then found to have marked double optic neuritis, but no localizing cerebral symptoms. A small polypus protruded from the meatus, but malignant growth was not suspected. The tympanum contained a little pus and granulations, but the antrum and mastoid cells when opened appeared normal. The temporo-sphenoidal lobe was explored through the tegmen tympani, and the cerebellum and lateral sinus through a backward extension of the wound, but beyond considerable increase of intracranial pressure nothing was found.

Patient left the hospital one month after this operation completely relieved, but with optic neuritis no better. Symptoms recurred in two months, and he became quite blind. In July, 1902, he died, three days after a second operation for the relief of pressure.

Case of Tumour of the Meatus Associated with an Abdominal Tumor.

MR. ARTHUR H. CHEATLE. (*Jour. Laryng. Rhin. Otol.* Feb., 1903.) A lady, aged about forty years, was first seen on April 4, 1902. She had never had trouble in the ear until October, 1901, when she had trouble in the right meatus, which caused pain and discharge; improvement occurred, but in the beginning of April, 1902, the discharge recurred, and deafness had been experienced with pain for some weeks. On examination, the anterior meatal wall was swollen, almost blocking the passage, and a granulation was present between the swelling and the roof of the meatus. There was no

swelling or tenderness outside the auricle. Everything pointed to a boil, and it was treated as such. She was not seen again until July 26, 1902, when she stated that the treatment ordered at the first visit had relieved her, and that the ear seemed well until May or June, when it began to get stuffy again, with occasional shooting pain. On examination, the aspect of affairs was precisely the same as at the first visit. This was so suspicious that a piece was cut out for microscopic examination, and Mr. Shattock reported that it was an endothelioma, while others have pronounced it to be an epithelioma. Finding that it was a malignant growth, arrangements were made for a thorough removal. Before this was done her doctor found out that she suffered from some abdominal trouble, and on examination discovered a big lump in the lower abdomen.

A thorough examination was made by Dr. Herbert Spencer under an anesthetic, and his report was as follows: "In the abdomen is a tumor, in places cystic, but for the greater part feeling solid, not absolutely fixed, reaching nearly to the umbilicus. The tumor extends behind the uterus and is distinct from it; it is clearly an ovarian tumour. The uterus is not enlarged, is in front of the tumour, and slightly movable. On the left side of the cervix, in the situation of the left utero-sacral ligament and evidently in the peritoneum, are two small nodules as big as the end of the finger, hard and fixed. They appear to be secondary growths in the peritoneum." Dr. Spencer decided not to interfere unless, in a few months' time, it was found that the "malignant secondary growths" had not increased in size.

In the face of the opinion concerning the abdominal trouble it was clearly unnecessary and unsurgical for an operation on the ear.

She was sent home with orders to keep the ear clean with lysol, and she has since reported that it is quite comfortable and that she is hearing well. The case demonstrates the necessity of a thorough general examination in tumors of the ear.

Case of Cholesteatoma of Attic and Antrum, with Good Result by Operative Opening of these Parts, with Preservation of the Ossicles, Membrana Tensa, and Cholesteatoma Matrix.

DUNDAS GRANT. (*Jour. Larynx., Rhin., Otol.*, Feb., 1903.)

Grace, W., aged eight, was referred by Dr. Anstruther Milligan on account of pain in the left ear and a history of otorrhea of twelve months' duration. The disease had probably originated in an attack of measles three years previously, but the pain of which she complained had come on suddenly one week before Dr. Grant saw her. She complained of slight vertigo and singing noise in the left ear-pain over the mastoid region, and slight swelling. A blister had previously been applied. A granulation projected in front of the handle of the malleus; there was no perforation found; it thus seemed pretty certain that the polypus grew from the attic, and it was accordingly removed. It was then evident that there was a large perforation in the membrane of Shrapnell. Two days later there was a copious discharge of blood and skin-like formations. He then decided to operate, but in view of the excellence of her hearing and the integrity of the membrana tensor and ossicles, he proposed to endeavor to preserve these. Accordingly the operation was carried out as for the ordinary radical mastoid operation. He chiselled away the outer wall of the attic under the protection of an angular guard, also the bony wall intervening between the mastoid cells and the external auditory meatus, and thus opened into a cavity filled with brokendown epithelium and lined by a fairly homogeneous shiny membrane. He scraped out the contents, leaving the matrix *in situ*, and turned back a flap from the posterior wall of the membranous meatus, then filled the cavity with iodoform moistened with 1 in 20 carbolic solution. Unfortunately, the occurrence of an outbreak of scarlet fever necessitated the removal of the patient to her home six days after the operation, where she went through an attack of this disease. From the time of the operation the patient was free from the pains of which she had previously suffered, and under Dr. Milligan's treatment the ear was nearly dry in from six to eight weeks.

Case of Objective Clicking Tinnitus.

E. CRESSWELL BABER. (*Jour. Laryng. Rhin. Otol.*, Feb., 1903.) The patient, a lady, aged thirty-five years, was first seen November 8, 1897, with a history of a clicking

noise chiefly in the right ear, which came on after an attack of influenza in February, 1896.

On examination, a faint clicking noise could be heard by the observer in either ear, loudest on the left side, with or without an auscultation tube. The pharynx showed spasmodic contraction of the velum, not always coincident with the noise.

She was treated with valerian and bromide, amongst other drugs. The continuous current was applied externally and to the palate, and an astringent paint was used to the pharynx.

On March 3, 1898, the note made was: "Noise almost ceased. It only comes on when she makes a muscular movement now." The patient was not seen again till recently (November 15, 1902), when she reported as follows: The noise has never ceased entirely. There have been two bad attacks since the last note. Two months ago she had a cold, which aggravated the noise. The latter varies much in frequency, and is very rapid when bad.

Present State.—A clicking noise, which has often a reduplicated character, can be heard with or without the auscultation tube in the left ear, more faintly in the right.

H.D. whisper, perfect both sides.

T.F. a'. Rinne, mastoid, B +, L +.

Bone conduction perfect on both mastoids.

R.M.T. slight manubrial injection, opaque, somewhat retracted.

L.M.T. opaque, somewhat retracted.

During the noise no movement of either membrane can be detected by the sight, or with an ordinary manometer (the meatus being full of air). Politzerizing does not change the appearance of the membranes or arrest the noise.

Pharynx.—Small granulations on the margin of the velum and small vessels on the posterior wall, which is catarrhal.

With each noise a slight spasm, with depression of the soft palate, takes place, which is most marked on the right side.

Larynx, normal. No movement of the thyroid cartilage can be detected during the noise.

Cocaine sprayed into the pharynx diminishes the noise slightly for a minute or two.

By posterior rhinoscopy the cushions of the Eustachian tubes are seen to be congested, but no movement of them can be detected.

A movement of the levator cushion can be seen during the noise.

No thickening in the vault of the naso-pharynx.

Case of Epithelioma of the Middle Ear.

ARTHUR H. CHEATLE. (*Jour. Laryng., Rhin., Otol.*, February, 1903.) The patient was a woman, aged sixty-three years, who came to King's College Hospital complaining of deafness and discomfort in the left ear of only a few weeks' duration. There was no discharge or history of discharge.

The middle ear was occupied by indolent-looking granulation tissue, pushing forward an apparently intact drum, which was incised and showed the granulation tissue behind; some of this was removed with the curette, and found to be epitheliomatous.

The progress of the disease had been very rapid during the two months following the examination. A mass had grown in the post-nasal space on the left side, pushing down the soft palate, which was paralyzed on that side. The mouth was drawn to the right, and the tongue showed paralysis of the left hypoglossal nerve. The pain in the ear had not been great, but was increasing. Some enlarged glands could be felt in the neck behind the jaw.

The onset of the ear trouble was very insidious, the appearance when first seen closely resembling a subacute inflammation of the middle ear, with a collection of fluid behind an intact drum.

A Case of Chronic Purulent Otitis; Extradural Abscess; Meningitis; Death; Autopsy.

ARNOLD KNAPP, New York. (*Archives of Otolaryngology*, Vol. XXXI, No. 5.) A man of 34 had suffered from left-sided otorrhea for 20 years. On admission he complained of pain about the ear and over the left eyebrow; vertigo and very fetid discharge. The Mt. is absent. There are granulations in the tympanum. On operation the antrum contained pus and granulations. The ossicles were absent. A reddish fibrous cord was seen passing over the oval window, and could be

followed into the aqueductus Fallopii; this was the inflamed facial nerve.

For 12 days the course was uneventful, then very severe head pains set in. Temp. 104° F., P. 90. Eye grounds normal. Evening temp. 101° F., and next morning 105.3° F. The presence of intracranial complications was now very apparent. The sinus was exposed and found healthy. A short distance internally to it a well-defined extradural collection of pus was evacuated and a small perforation found in the dura from which cerebro-spinal fluid escaped. Meningitis had already set in, for on the following day a paralysis of the left external rectus, delirium and extreme frontal headache set in. The patient became comatose, lumbar puncture drew off turbid fluid.

On autopsy the sinuses were free, the aqueductus Fallopii showed a large defect in the posterior tympanic wall. The oval window was enlarged downward, containing granulations and a remnant of the stapes. The internal auditory nerve and its contents appeared normal. *Campbell*

A Brief History of Bacteriologic Examinations in Suppurative Otitis Media, with Remarks on the Relative Virulence of the Various Micro-Organisms.

PHILLIPS, New York. (*Archives of Otology*, Vol. XXXII, No. 1.) The author points out the necessity of making bacteriologic examination of the pus in all cases of purulent otitis media immediately after a paracentesis or spontaneous rupture of the Mt.

Where micro-organisms are found in combination we are accustomed to report the inflammation as due to the predominating type of micro-organism.

The streptococcus is the most virulent of all the pathogenic organisms found in purulent otitis. This is true, both as to the rapidity of its invasion and to the severity of the accompanying symptoms. A few hours will sometimes suffice for an invasion of attic, antrum and the cells of the mastoid.

Next in virulence is diplococcus intercellularis meningitidis.

The staphylococcus is generally found in company with the streptococcus.

The pneumococcus is more frequently found in purulent otitis media than any of the others, but is not especially virulent. *Campbell.*

The Treatment of Acute Otitis Media.

BEZOLD. Munich. (*Archives of Otolaryngology*, Vol. XXXII, No. 1. In the simple acute and perforative otitis media, the objects to be attained are:

1. The morbid products must be completely removed, or their rapid absorption assured.

2. The reinfection of the diseased cavities is to be prevented.

3. Permanent and favorable conditions for drainage.

The first indication is met by the air douche and paracentesis.

In severe grades of inflammation where the tympanum is filled with secretion and the Mt. is bulging, the air-bag is always preceded by paracentesis. To force out the secretion the author employs air douche through the external auditory canal, and the compression is made during the act of swallowing.

Later when the nose and naso-pharynx are practically normal Politzer's method may be employed. After paracentesis and the air douche, a small quantity of boric-acid powder is insufflated by means of a pipette. As long as the mastoid is tender, the ice-bag is applied for hours.

The author employs cotton tips to remove discharge from the auditory canal. The patient frequently repeats Valsalva's experiment, and then by the aid of a mirror the discharge is mopped out. He vigorously protests against the gauze packing of the ear canal, claiming that it encourages putrefaction and is very prone to be followed by complications.

The canal is irrigated once daily with a 4 per cent. boric acid solution.

Campbell.

Chronic Sphenoiditis in its Relation to Disease of the Middle-Ear.

EMERSON. (*The Laryngoscope*, January, 1903.) An analysis of 268 cases of chronic catarrh of the middle ear. Caries of the sphenoid was found in twenty-five cases, that is 9.3 per cent. Ten more cases are added for analysis. Thirty-two were unilateral, eighteen on the right, fourteen on the left side, two bilateral and one unilateral in doubt. Twenty-two cases were associated with chronic catarrhal,

four with chronic suppurative ears, seven presented catarrhal on one side and chronic suppurative on the other.

The etiology was unsatisfactory, especially trying to trace the influence of influenza, the infectious diseases, etc.

Headache, usually severe was the rule; some also had vertigo. Seven were accompanied by frontal, four supraorbital, two supraorbital and occipital, and one vertex and occipital.

The number of times a drop of pus was observed in the opening of the Eustachian tube emphasized the necessity of careful cleansing of the nasopharynx, and posterior rhinoscopy before the catheterizing as a necessary precaution.

Seymour Oppenheimer.

Remarks on Thrombosis of the Sigmoid Sinus with three new cases.

E. GRUENING (*The Laryngoscope*, January, 1903) calls attention to the anatomic peculiarities of certain temporal bones called dangerous ones in which (a) the sigmoid sinus runs far forward, curves inward and passes over the projecting ledge of bone forming the posterior boundary of the jugular foramen, (b) the jugular bulb rises forward to the floor of the tympanic cavity and lies on a higher plane than the lowest part of the sigmoid sinus; (c) the floor of the tympanic cavity is often as thin as paper.

Three cases of sinus thrombosis are reported in which anatomic peculiarities of the temporal bone existed.

Seymour Oppenheimer.

On the Value of Electrolysis in the Eustachian Tube

NORVAL H. PIERCE. (*The Laryngoscope*, January, 1903.) The writer concludes that in otosclerotic disease electrolysis is useless; in the great majority of cases of catarrhal disease it has no advantage over other methods of treatment, in a certain few cases where there is probably a soft exudate near the isthmus, it may be regarded as of some value.

Seymour Oppenheimer.

A Piece of Bougie in the Eustachian Tube.

J. O. Tansley (*The Laryngoscope*, January, 1903.)

A case is reported of a patient who had undergone a course of treatment for middle ear catarrh and a stricture of the eustachian tube without success.

The patient subsequently consulted the writer who found a body in the Eustachian orifice—the bulbous end of an electrolysis probe about three-fourths of an inch long which he withdrew.

Electrolysis in these conditions is condemned.

Seymour Openheimer.

II.—NOSE AND NASO-PHARYNX.

Hay Fever.

A. THOST (*Münchener Med. Wochenschrift*, 1902, No. 17,) has worked up 400 cases of hay fever to which he had access, with the aid of a schedule of questions. Three factors co-operate for the production of the disease—an external cause, a local one and a general diathesis. The external cause comprises, in addition to the pollen of flowering grasses, other dust and gas generating substances. The importance of the vegetation lies in the occurrence of the attacks at a fixed time, in the South much earlier than in the North. The local diathesis manifests itself in the presence of a catarrhal swelling of the nose, as is often found in weakened individuals. The general predisposition consists in a neuro-pathic state. The better classes are far more often attacked. No age is free, but the cases decline in number with the more advanced years. Overexertion and excitations are regarded as causes. Then come infective diseases, especially influenza. Gout does not enter into consideration. Heredity is perhaps often present.

Levy.

The Pathology and Therapy of Frontal and Ethmoidal Sinusites and Their Orbital Complications.

AXENFELD. (*Deutsche Med. Wochens.*, 1902, 40.) Orbital phlegmon results usually from conditions in the nose or accessory sinuses. The primary focus may not be demon-

strable at the time of the operation. In acute cases the opening of the accessory sinus is not absolutely necessary, since these can heal spontaneously, but the orbital abscess must be evacuated. If it is desired to open the frontal sinus secondarily, in order to prevent infection, it is necessary to open from the forehead inward. In one of the author's cases, while opening a suppurating frontal sinus, the healthy frontal sinus was opened, without an infection of the latter following.

Lery.

Rhinitis Fibrinosa, Crouposa S. Pseudomembranosa.

J. MOELLER. (*Hospitalstidende*, 39, 1902.) The history of two patients suffering with rhinitis crouposa is given; in one diphtheria bacilli by inoculation were found, in the other Fraenkel's pneumococcus.

After the author had discussed the diagnosis, etiology and treatment of the disease with reference to the extensive literature on the subject, he summed up as follows: The chief point in the clinical picture consists in the occurrence in the nasal cavities of a pseudomembrane which does not arise in connection with a synchronous diphtheria or after an operation. The disease is acute and is recognized by a severe watery discharge and increasing obstruction of one or both nasal passages. The obstruction increases until it is complete, whereupon an expulsion of the membrane follows.

The great majority of cases appear in children; the course is exceptionally mild; there is usually no disturbance of the general health; there is usually no tendency to extend itself beyond the limit of the nasal cavities and in the course of some weeks it disappears with restitutio ad integrum. The disease can occur in different ways; by infection with different bacteria during a simultaneous action of other etiologic factors in the nasal mucous membrane; in the great majority of cases it is caused by diphtheria bacilli, which are sometimes contagious.

Fischer.

Recurring Multiple Angiomata of the Septum.

JOHN O. McREYNOLDS, Dallas, Texas. (*Jour. Amer. Med. Assn.*, Mar. 7, 1903.) In the case reported there are a number of dark blue elevations of the size of a pea, situated on each side of the cartilaginous septum, most numerous anteriorly, and composed almost entirely of blood vessels of the

venous type. On the very slightest provocation these little blood tumors break, and without any discoverable reason they will bleed furiously for an hour or more, until the loss of blood is at times very great. Aside from this the patient is not a bleeder.

The most successful treatment has been the use of the electric cautery for the complete destruction of the tumors. Up to the time of the report they have been recurring every few weeks. Electrolysis has of late given better results than the electric cautery.

Richards.

Contribution to the Pathologic Histology of Syphilitic Ethmoiditis.

J. L. GOODALE, Boston. (*Jour. Amer. Med. Assn.*, Mar. 7, 1903.) "The tissue changes consist essentially in a proliferative periostitis, with a new formation of bone in the form of irregular excrescences, in association with a proliferation of the connective tissue in the vicinity and of the endothelial cells of the arteries, leaving in places an obstruction of their lumen. These changes partake of the character of a granulation tumor rather than of a gumma, and are to be referred to the class of syphilitic new growths termed syphiloma."

Richards.

Acute Sinusitis.

J. A. Stucky, Lexington, Ky. (*Jour. Amer. Med. Assoc.*, Feb. 21, 1903.) Dr. Stucky finds the hot nasal douche used twice daily, with either hot normal saline or Seiler's solution one-half strength, to keep the nasal passages clean and to be very soothing and grateful. Where the passages are occluded a small quantity of the following solution sprayed into the nostrils every two to four hours is effective and rapid in action.

Sodium chlorid,	5 gr.
Resorcin,	5 gr.
Adrenalin sol. (1-1,000)	1 dr.
Aqua,	7 dr.

He does not advocate the use of cocain or opiates, on account of their unpleasant reaction. Special attention is to be given to the systemic conditions. When the anterior end of the middle turbinal is swollen and occludes the natural outlet of the sinus, its removal is indicated.

Richards.

The Prophylaxis of Sinus Disease.

D. BRYSON DELEVAN, New York. (*Jour. Amer. Med. Ass'n.*, February 21. 1903.) The importance of severe coryzas should be recognized, and the utmost done from the moment of the onset of the trouble to prevent its extension and involvement of the sinuses. The pernicious practice of allowing a cold in the head to run its course is probably responsible for large numbers of cases of chronic sinus disease.

Treatment should be non-irritating, consisting of cleansing solutions, followed with the application of mild solutions of cocain and adrenalin to the sinus outlets. *Richards.*

Sarcoma of the Nares and Ethmoid Cells.

JOSEPH S. GIBB, Philadelphia. (*American Medicine*, November 1, 1902). The case reported was a woman 38 years of age, who had had what were apparently mucous polypi removed at varying intervals over several years. Microscopically the diagnosis had been mucous polypi. Later, however, there became narrowing of the middle turbinate; the masses seemed to change in color; spontaneous attacks of epistaxis of an alarming character appeared; there was bulging of the intranasal mass within the ethmoid cells; the orbital cavities were encroached upon; all the clinical evidences of sarcoma appeared; and the growth finally burst through the orbit.

As a result of his investigations, the author believes that any surgical treatment of malignant disease in this locality, that is any way short of absolute removal, is contraindicated; and that intranasal measures by means of the snare, forceps and curette, rarely effect much permanent good and run the risk of stimulating the process to increased activity.

Richards.

Polypi in the Nasal Accessory Cavities.

A. R. SOLENBERGER, Colorado Springs, Col. (*Philadelphia Medical Journal*, December 20, 1902.) It is not possible in every case to state whether nasal polypi originate in the bone or in the mucous membrane. Caries is the usual cause of their recurrence, and the diseased tissue usually extends beyond the point where the surgeon may invade with curette and gouge. Every means should be taken to ascertain

whether or not there is caries beyond the pus and polypi or in any of the remotest of the labyrinthian recesses of the nose.

Four cases of polypi in the maxillary antrum and one in the sphenoidal cavity are reported. *Richards.*

A Nasopharyngeal Tumor, with Exhibition of Patient.

G. HUDSON MAKUEN, Philadelphia. (*American Medicine*, November 22, 1902.) The tumor was so situated as to almost entirely occlude the left nostril and partially occlude the right; and in the rhinoscopic mirror it had the appearance of filling the vault of the pharynx. It was attached to the vault in the region of the pharyngeal tonsil. It was an edematous, fibromatous growth, crossed by stratified epithelium. Various attempts had been made to remove it with the cold wire snare, and in each instance copious hemorrhages had been the result, and several wires had been broken. With the aid of No. 10 silver wire a small portion of it was removed. Severe hemorrhage followed. The growth has not yet been entirely removed. *Richards.*

The Anatomy of the Operation of Reaching the Ethmoid Cells Through the Antrum.

HARRIS PEYTON MOSHER, Boston. (*American Journal of the Medical Sciences*, November, 1902.) This paper is a study of the applied anatomy of the operation of reaching the ethmoid cells through the antrum, and is accompanied with illustrative drawings.

The antrum having been opened from without, a curette entered through the ostium and inclined toward the septum and carried back in this incision, would strike first the ethmoid bulla, with the rest of the middle ethmoid cells, then the posterior cells, and finally the anterior wall of the sphenoid. In this region there is a working space of about one-half inch from above downward.

In combined empyemata of the antrum and middle and posterior ethmoid cells, this route should give good results, but it is not adapted to frontal sinus trouble, except in cases in which the frontal suppuration is secondary to suppuration in the ethmoid region.

Richards,

The Operative Treatment of Malignant Growths In the Upper Portions of the Nasal Cavities.

E. J. MOURE (*Journal de Médecine de Bordeaux*, June 29, 1902), discusses the removal of malignant tumors of the nasal cavities, through the natural orifices, and reports a case of epithelioma of the perpendicular plate of the ethmoid, removed through the nasal opening. Repeated recurrences followed, and were removed, the total duration of the affection being 3 years, 5 months.

Of the cases of malignant disease of the upper portion of the nasal cavities, the author recommends the following mode of procedure. Division of the skin of the nose in the median line from above downward, laying bare the bone, excision of the nasal bone, and a portion of the nasal process and of the frontal bone and of the superior maxillary of the corresponding side, thus laying bare the ethmoid cells which may readily be removed. Hemorrhage is considerable but may be controlled by tampons. It is desirable first to tampon the posterior nares. The author reports a case of epithelioma of the ethmoid cells, operated upon by this manner, whose general condition 11 months after the operation was excellent.

Goodale.

Typhoid Naso-Pharyngitis Due to Eberth's Bacillus.

GALLAIS, Courcoux and Decovert (*Le Bulletin Médical*, November 29, 1902), have studied 5 cases of naso-pharyngitis, in two of which they were able to find Eberth's bacillus. This discovery leads the writers to discuss the question of prophylaxis in cases of naso-pharyngitis, particularly when occurring in the vicinity of typhoid patients.

Goodale.

Treatment of Atrophic Rhinitis by Submucous Injections of Paraffin.

CARLES. (*Journal de Médecine de Bordeaux*, July 27, 1902) has employed in 10 cases of atrophic rhinitis, interstitial injections of paraffin into the lower turbinates. He uses paraffin, melting at 60 degrees centigrade, and introduces it in one or several injections into the erectile tissue. This brings about immediately an artificial hypertrophy resembling that of the natural swelling of the mucous membrane. During the following days, without other therapeutic

tic intervention, the crusts and the odor disappear totally.

Goodale.

The Diseased Middle Turbinate.

CHARLES H. BAKER, Bay City, Mich. (*Jour. Amer. Med. Assn.*, Mar. 14, 1903.) The author advocates the removal of the middle turbinate in all cases of recurrent polypus of the middle turbinal itself; in all cases when removal of polypus opens and reveals collections of pus issuing from the sinuses, and in cases when by pressure the enlarged turbinate causes reflex nervous ailments, such as muscular asthenopia, persistent headache, chorea or epilepsy and especially asthma.

Richards.

Digestive Disturbances in Diseases of the Nose and Rhinopharynx.

LANDOLT. (*Gazette Hebdomadaire de Medicine et de Chirurgie*, October 9, 1902.) Disease of the nose and pharynx constitutes a serious danger to the whole system, and may be accompanied by digestive difficulties, due to the swallowing of products of pathologic secretion. The mucus, pus, or crusts coming from the nasal cavities, or from the naso-pharynx, may produce in the stomach two distinct series of disorders: First, dyspepsia, due to the neutralizing of the hydrochloric acid of the gastric juice, causing digestion to cease, and leaving the field open for different fermentations, such as lactic, butyric, etc. Second, septic gastritis, due to the same pathogenic organisms which produced the original nasal or pharyngeal diseases. Treatment of gastric disorders should therefore be preceded or accompanied by appropriate measures directed to any accompanying nasal or naso-pharyngeal affection.

Goodale.

A Case of Myxo-Sarcoma in the Nasal Cavity.

MAYO COLLIER (*Jour. of Laryng., Rhin. and Otol.*, Jan. 1903) showed the case of a man, aged fifty-nine, who presented himself at the North-West London Hospital complaining of complete obstruction in the left nostril, extending over a period of three months. There had been no pain and no bleeding, but a glutinous discharge was constant from the left side of the nose.

An examination revealed a soft gelatinous growth, appar-

ently springing from the lower turbinal body, and which bled at the lightest touch.

An attempt was made to remove this, as well as the whole lower turbinal body. After removal of the lower turbinal body, it was found that the growth extended to the roof of the nose and invaded the vault of the pharynx.

A Case of Extreme Displacement of the Nose.

MAYO COLLIER. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) This case was one of considerable interest, an operation having in the main corrected the deformity and afforded ample breathing space.

The dislocation of the nose was extreme, the tip being under the right eye. The left nostril had been occluded for fourteen years, and very little air entered the right. The septum was pushed over to the left side, and literally lined the outer wall of the left nasal fossa. The right cavity was correspondingly enlarged, and a very large lower turbinal body occupied the concavity of the septum. A fine keyhole saw was forced into the lower meatus, and the ridge of the maxillary and palate bones divided and removed. The vertical plate of the ethmoid bone was then fractured and pushed over to the opposite side. Some of the cartilaginous septum was removed.

The result was, so far, all that could be wished—a nearly straight nose and ample nasal respiration. No splints or supports of any kind were used.

Case of Vascular Naso-pharyngeal Fibroma of Extensive Origin Finally Removed by a Combined Operation Through the Soft and Hard Palate, and Extensive Removal of Anterior Wall of Left Supramaxillary Bone.

HERBERT TILLEY. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) F. S—, male aged fourteen, came to the hospital November 19, 1901, complaining of complete nasal obstruction associated with a blood-stained discharge from the left nostril, of five months' duration. For the last three weeks the discharge had been offensive, and for seven or eight weeks the right nostril had been completely occluded. It was noticed that the patient was weak and anemic. The lower half of the nose was much broadened, and the left nostril distended by a gray sloughing mass, which bled

freely when touched by a probe. The discharge from the left nostril was very offensive, while the right was completely occluded by marked deviation of the nasal septum. By posterior rhinoscopy the left choana was seen to be filled by a reddish mass, which passed insensibly on to the mucous membrane of the naso-pharynx. Digital examination revealed a smooth-surfaced elastic swelling, which seemed to spring from the basi-sphenoidal and ethmoidal regions. There was no displacement of the left eye. Transillumination showed opacity of the left antrum.

First Operation, November 20, 1901.—Having made an inverted U-shaped incision over the sides and root of the nose, the nasal bones were divided in the line of incision with a saw, and the nose turned downward on the face. This brought the growth well into view, and procured easy access to the ethmoidal region. The growth was seized in strong forceps, and some half of it torn and cut away, but it was soon obvious that the base of the tumor was too extensive for removal through the opening. The hemorrhage was very profuse, and could only be kept in check by compressed marine sponges forced into the nasal cavity. Respiratory difficulties arose owing to blood escaping into the larynx, in spite of the post-nasal space having been plugged.

The nose was finally replaced and sutured in position; it healed by immediate union. Dr. Horne reported the growth to be an angeio-fibroma, and free from any elements of malignancy. The iodoform gauze packing which was used to plug the nasal cavity at the end of the operation was removed through the nostril in forty-eight hours. The patient made a rapid recovery from the shock of the operation, and three weeks later it was determined to attempt the removal of the growth by a different method.

Second Operation, December 7, 1901.—Having inserted a laryngotomy tube, and placed a sponge above the larynx, a Whitehead's gag was employed to keep open the mouth. With the patient's head hanging slightly backward over the end of the table, the soft palate was completely divided in the middle line, the incision being carried forward to the alveolar border, immediately behind the incisor teeth. The mucous membrane was stripped from the left half of the hard

palate, and the latter completely removed by chisel and mallet. The growth was thus brought fully into view, and its base was seen to be attached to the left basi-sphenoidal and ethmoidal regions. Its base was seized in an ovariectomy clamp, and the greater part of the growth removed by scissors. Other smaller portions were removed by means of strong wire snares and cutting forceps. The hemorrhage was free, but under good control, and it was checked by marine sponges on holders. As far as the eye and finger could ascertain, all the tumor was removed. The patient, although only thirty-five minutes under the anesthetic, had at the end of the operation a weak, rapid and intermittent pulse, which quickly recovered under the influence of a rectal injection of $1\frac{1}{2}$ ounces of brandy, and strychnin, 1-30 grain, administered hypodermically.

The long strip of iodoform gauze which was packed into the naso-pharynx at the end of the operation was removed in forty-eight hours, and the nasal cavity subsequently irrigated three times daily with a warm alkaline wash.

The patient made a rapid recovery; but after an interval of three weeks the growth was seen to be recurring, and in the course of six to eight weeks it was obvious that further intervention would be required.

March 15, 1902.—A third operation, identical in all details with the last, was carried out, but possibly a more thorough clearance of the growth was made.

A month later recurrence was visible in the region of the middle meatus, and every week during the months of May, June and July the patient attended as an out-patient, the treatment consisting of piercing the growth in many places with the galvano-cautery. This seemed at first to retard its growth, and produced a number of puckered scars, but latterly it became obvious that the growth was increasing in size. Toward the end of July it projected through the cleft of the palate, and nasal obstruction again became complete. The lad was anxious that yet another attempt should be made to eradicate the growth, a request which received some encouragement from the report of the pathologist—viz., that there were no signs of malignancy in the piece of tumor which he had examined. Since the recurrence seemed to spring

from the middle meatal region, and the left antrum was very opaque on transillumination, it was decided to explore that cavity.

July 31, 1902.—With the preliminaries as in the preceding operations, an incision was made in the gingivo-labial furrow from the level of the left molar tooth across the middle line to the corresponding position on the right side. The cartilage of the nasal septum was divided along its floor by strong scissors, and the nose and soft parts of the face on the left side turned upward, so as to fully expose the anterior surface of the left maxillary bone. The front wall of this was then completely removed, and the antral cavity found to be filled with the growth, which was very vascular and firmly attached to the whole of the posterior and upper walls. To gain more room the lower half of the ascending (nasal) process of the maxillary bone was removed by means of strong bone forceps. The portion of the growth extending into the mouth was then removed by a strong wire snare; the remainder was seized in a pair of powerful tonsil forceps and torn away from its attachments, leaving completely bare the left side of the basi-sphenoidal, ethmoidal, and maxillary antral regions. Hemorrhage was checked by means of marine sponges. The after-treatment consisted of syringing out the nose and left antrum three times daily for three weeks with warm boracic lotion.

The patient made a rapid recovery, and left the hospital fourteen days after the operation. At the present moment (November 7) there is no sign of recurrence, no nasal discharge, the parts appear perfectly healthy, and the patient is in robust health, having grown two inches since the first removal of the growth. It now only remains to close the cleft in the soft palate.

A Readily-Improved working Model to Demonstrate the Air Channels and Currents in the Nasal Cavities in Normal and Impeded Nasal Respiration.

SCANES SPICER. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) This apparatus had been contrived from objects which would probably be in the possession of most rhinologists. It consisted of a Betz plaster model of the half-head as seen on medial sagittal section, the septum nasi having

been removed; a soft, flexible, perforated metal Asch's tube splint; 12 inches of India rubber tubing (five-eighths inch in diameter); some plasticine modelling composition; and a sheet of clear glass 10 by 8 inches. The flexible metal tube was moulded to represent accurately the form and dimensions of the vestibule and rima naris, and then puddled on to the alar region of the plaster model with plasticine; the rubber tubing was similarly affixed to the lower end of the pharynx of the model. A cord of plasticine one-third inch in diameter was then accurately affixed to the margins of the nasal and naso-pharyngeal cavities of the model, and the sheet of glass pressed down so as to allow no leak anywhere. The model was now filled with smoke from a cigarette through the rubber tube.

On inspiring or expiring air through the rubber tube, the passage of the entering or out-going current of air through the dense smoke could be easily traced. The normal inspiratory current in quiet breathing is seen to issue from the rima and spread out like a fan to impinge on the front part of the middle turbinated body and adjacent parts. It then sweeps rapidly round the roof of the nose and naso-pharynx, passing chiefly through the upper two-thirds of the nasal cavity. A vortex is also seen to be formed by a current becoming detached from the main stream just in front of the posterior nares which impinges downward and forward on to the floor of the nose, and then curls round the front end of the inferior turbinated body. The inspiratory current does not normally pass through the inferior meatus.

The normal expiratory current in quiet breathing passes chiefly through the lower two meatuses, and a vortex is formed in the fore part of the nasal cavity in a reverse direction to that of the preceding.

The glass can be removed, and any pathologic condition, such as spurs, deflections, polypi, adenoids, etc., can be represented in size and position by lumps of plasticine; and on replacing the glass as before their effects in diverting the normal currents could be easily studied and the conditions varied.

Mr. Spicer thought it might with reason be objected that the anatomic conditions were not exactly reproduced, and

that the ala did not move as in normal respiration; but the approximation must be fairly accurate, for it was remarkable how the results agreed with Paulsen's and Franke's researches on the cadaver, and Parker's deductions from his lycopodium powder experiments.

The full results of observations made would be deferred for a future communication, but in the meantime, considering how readily the apparatus could be arranged and worked, doubtless many rhinologists would test it and compare the results with their previous ideas on the subject.

Left Antral Empyema, Followed by Abscess of Hard Palate and of Septum Nasi.

HUNTER TOD. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The patient was a medical student, who three months ago had a severe attack of toothache on the left side, followed, on the second day after the onset, by swelling of the face, and on the fourth day of the hard palate on the same side also. On the sixth day an abscess of the palate had burst into the mouth; at the same time he had noticed the nose had become swollen and obstructed. Two weeks after onset a dentist extracted the second incisor, canine, and first bicuspid teeth. The swelling of the face gradually diminished. Mr. Tod saw him three days later. He then had an obvious abscess of the septum, which blocked both anterior and posterior nares. The left antrum was dark on transillumination. The abscess of the septum was incised; much offensive pus escaped, and the nose was kept clean by a simple wash. A month later the nose appeared healthy but for great thickening of the septum, seen by posterior rhinoscopy, and there was a drop of pus in the middle meatus of the left side of the nose. The second molar was extracted, and the antrum, which contained much pus, was drained through the alveolar arch. The patient was now practically well. There was no necrosis of bone and no perforation of the septum.

Double Antral and Frontal Sinus Disease; Left Side Cured by Radical Operation; Question of Operation on the Left Side.

HUNTER TOD. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The trouble in this case probably dated from an attack of influenza in 1897, since which the patient had suf-

ferred from headaches, gradually increasing in severity, and had noticed much purulent discharge from right side of the nose. The headaches had incapacitated him from working since onset.

About Christmas, 1901, there was an abscess over the left eye. This was scraped twice at a provincial hospital. On admission to the London Hospital the left eye was nearly closed from edema and infiltration of the supra-orbital tissues, and there was a tiny fistula leading into the frontal sinus. The nasal cavity on that side was normal. The right side was filled with polypi, and there was much pus. The anterior half of the right middle turbinate and the polypi were removed. A week later, after cleansing the nose, the antrum was explored with a fine trocar; it contained pus. Similarly, a cannula was passed into the fronto-nasal duct, and pus was washed out of the frontal sinus. Exploration of the left antrum proved it full of pus, although the nasal cavity appeared normal.

A radical operation, consisting of removal of all anterior and inferior wall of the left frontal sinus, which was filled with polypi and pus, was performed, and a passage made into the nose. The patient was practically well on the seventh day, and left the hospital on the tenth. A tube was worn in the fronto-nasal duct for two months. Since then there had been no recurrence.

The antra were drained through the alveolar arch. The left side was now cured. There was still pus in the right frontal and antral sinuses, proved by repeated washing out of the sinuses. The patient, however, since the operation on the frontal sinus, had had no further headache, and felt and looked well. He had not been seen for two months before being shown to the Society. He had now so greatly improved that the question of operation on the right side hardly arose. There was considerable flattening over the right frontal sinus, but to this the patient did not object.

**Case of Laryngitis Hypertrophica following
Prolonged Nasal Trouble.**

HUNTER TOD. (*Jour. Laryng. Rhin. and Otol.*, Feb., 1903.) The patient had suffered from nasal obstruction, due to continuous nasal catarrh, for five years. For the last

four years she had been hoarse, and had been troubled with a severe cough and continued hawking up of mucous secretion from the throat.

She came to the London Hospital three months ago, and was found to have marked hypertrophic rhinitis, with much muco-pus trickling down the pharynx into the larynx. The larynx showed marked hypertrophy of the interarytenoid region, and also of the vocal cords, which latter were very thick, irregular, and of a red, beefy appearance, and there was considerable muco-purulent secretion to be seen.

The nose was first treated, the hypertrophic tissue being removed by the snare. The nose and pharynx were practically normal; there was no longer any nasal obstruction, and no muco-purulent secretion in the pharynx.

Collodium After Nose Operations.

PISCHEL, San Francisco. (*Archives of Otolaryngology*, Vol. XXXI. No. 5.) After operation, bleeding is stopped by adrenal solution, then with a metal tube, e. g., a Eustachian catheter, to one end of which is fastened a rubber bulb, collodium is dropped steadily on the wound while an assistant blows compressed air into the nose to quicken evaporation. Occasionally a wisp of cotton is placed on the wound first, to increase the power of the collodium. The author removes this membrane in a few days to avoid infection by retention.

Campbell

III.—MOUTH AND PHARYNX.

The Degenerate Tonsil.

EDWIN PYNCHON, Chicago. (*Jour. Amer. Med. Assoc.*, Mar. 21, 1903.) Dr. Pynchon's operation consists in the dissection out of the entire tonsil with the electrocautery. This operation gives a practically bloodless field, so that all the diseased tonsillar tissue can be cleanly removed. It can be done under local anesthesia. The operator has employed it more than 1,000 times, and finds that as a rule the tonsil peels out with facility and often bloodlessly. The results have been ideal and have generally yielded a throat with fauces pink, with mobile and approximating pillars, one in

which in the case of vocalists a high register has been enhanced by two or three notes, and in which the tonsillar region is never afterward the source of pain or discomfort to the patient.

Richards.

The Local Pathology of Acute General Infection Arising Through the Lymphoid Tissue of the Fauces.

J. L. GOODALE, Boston. (*Boston Medical and Surgical Journal*, Sept. 25, 1902.) As a result of his own experiments the author does not regard the tonsils as protective organs in the sense of themselves producing phagocytic leucocytes, but rather as representing unusually open channels of communication between the interior of the organism and its exterior, along which polynuclear leucocytes make their way from the blood vessels to the surface of the mucous membrane.

Longitudinal sections of crypts showed the largest number of bacteria near the orifice, in both acute and chronic inflammations. The polynuclear leucocytes probably restrict the development of the bacteria in crypts.

As a rule, in acute inflammation of the tonsils, the result of infectious micro-organisms is to form local abscesses in the crypts, which discharge their contents through the crypts. At times, however, these intrafollicular abscesses discharge into the efferent lymph channels, and such cases may form the beginning of a circumtonsillar abscess.

Acute infectious bacteria multiply in the tonsillar tissue proper, but only when a penetration has been effected into the germ centres of follicles. Experiments lead us to assume with reasonable probability that these micro-organisms may be carried beyond the capsule of the tonsil into the adjacent lymph glands, there producing acute suppurative inflammation. If the intrafollicular abscess should discharge into the veins, the condition present would be adequate for the production of a general septicemic infection.

Richards.

Lichen Planus of the Tongue.

At a meeting of the Societe Francaise de dermatologie et de syphiligraphie, Balzer (*Bulletin Medical*, December 13, 1902), presented a case of this affection, the diagnosis of which was facilitated by other characteristic lesions on the skin. In the discussion, Darier said that lichen planus of the tongue may occur in three different forms; first the

form *en nappe*, second a form where there exists simultaneously these smooth lesions and papules, rising from the surface.

The third variety is characterized by the arrangement of white spots to form a network.

Fournier said that this case of lichen resembled the ordinary leucoplakia, and that it was probably similar occurrences which led to the reports of the so-called cure of leucoplakia. This latter disease is not curable, while lichen planus is. Barthelemy disagreed with Fournier, since in his experience, leucoplakia might be cured and he cited two cases. Fournier in reply said that syphilitic leucoplakia might be cured, but that the true leucoplakia which manifested itself by the formation of ridges on the surface of the tongue was incurable.

Goodale.

Pseudo-Membranous Angina due to Syphilis.

G. BELLAN (*Gazette Hebdomadaire de Médecine et de Chirurgie*, October 23, 1902), discusses a form of pseudo-membranous angina occurring in secondary syphilis, particularly in those individuals who have been previously subject to recurrent attacks of tonsillitis. Clinically they are distinguished by the long duration of the dysphagia, the absence of fetid odor in the breath, and the existence of an ulceration below the false membrane.

Goodale.

Fetor ex Ore Castro-Intestinalis.

ROSENHEIM. (*Therapie der Gegenwart*, Nov. 1902.) The most frequent causes are diseases of the mouth, teeth, tonsil, throat, and nose. In uremia there is the smell of trimethylamine; in the cystitis of prostatic patients the e is a very offensive smell. Often the cause is an affection of the alimentary canal such as carcinoma, ectasia and stricture. Affections of the stomach usually indirectly cause a fetor ex ore by causing diseases of the mouth; directly, they cause it very seldom, viz., by eructations of gaseous decomposition products. This occurs most frequently in carcinoma and dilatation of the stomach. Disagreeable gases are absorbed by the gastric mucous membrane and thrown off by expiration. This is undoubtedly the case in intestinal affections. It is an almost constant symptom of carcinoma of the large intestine, in advanced stages often in

acute and chronic constipation, on the other hand also in diarrheic conditions, dysentery, tuberculosis, typhoid fever. Even in scarcely perceptible gastric affection, the fetor ex ore can be very offensive. The cause is the decomposition of the albuminous food products. A milk and vegetable diet is beneficial in these cases. Likewise regulation of the bowels is important. Menthol taken internally acts antiseptically. *Levy.*

The Recognition of Chronic Pharyngeal Diphtheria.

NEISSER. (*Deutsch. Med. Wochens.*, 1902, 40.) As a supplement to previous communications, the author reports a case of multiple diphtheria in a family. The source of infection was found to be a house girl, in whose throat were large numbers of diphtheria bacilli. Objectively, the typical picture of atrophic pharyngitis was found. In spite of long continued treatment, it was impossible to make the bacilli disappear. Her blood was found to be very antitoxic.

Levy.

Granular Pharyngitis.

E. J. MOURE. (*Journal de Medicine de Bordeaux*, March 16, 1902.) Secondary granular pharyngitis may be due to naso-pharyngeal inflammations, to sinusitis, to recurrent attacks of colds in the head, to nasal polypi, spurs or deviations of the septum, in short, any lesion which compels the patient to breathe chiefly through the mouth. True idiopathic granular pharyngitis, on the other hand, is observed particularly in those individuals who make excessive use of the voice, or are exposed from their occupations or habits to frequent attacks of acute pharyngitis. Two forms are observed, the first so-called exudative form, where the mucous membrane is thin and smooth, but diffusely reddened and elevated, and traversed by dilated and sinuous vessels. In the second form the pharyngeal wall is studded with a series of reddish granulations, more or less confluent, even appearing as an irregular prominence, situated behind the posterior pillars. From the point of view of diagnosis and treatment, it is important to determine which form is present. Where the condition is dependent upon other abnormalities either local or general appropriate treatment to these should be

given first. The following prescription may be applied to the posterior pharyngeal wall, once or twice a week:

R	Iodin Crystals	25.
	Iodid of Potassium	30.
	Tr. Opii.	3.
	Glycerine	120.

In other cases, tincture of guaiacum gives excellent results, and may be prescribed as follows:

R	Sod bibor	6.
	Antipyrin	4.
	Tr. Guaiac	5.
	Mentholated Alcohol	5
	Glycerine	140.

M. S. Teaspoonful in a glass of water to be used as a gargle. *Goodale.*

Case of Complete Adhesion of Soft Palate to Posterior Wall of Pharynx.

LAMBERT LACK. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient was a woman aged about thirty. There was complete union between the soft palate and posterior pharyngeal wall; not even the finest probe could be passed up from the mouth into the naso-pharynx. This was evidently the result of tertiary syphilis, although it was the only lesion, and there was no active disease. The patient had trouble in swallowing at times, occasional shooting pain in the ear, but not severe, and much mucus collected in the post-nasal space and had to be syringed away through the nose.

IV.—LARYNX.

Some Cases of Spasm of the Glottis and Convulsions in Children Whose Cure Was Accomplished By Removal of Adenoid Vegetations.

MAALOC, Copenhagen. (*Hospitalstidende*, 29, 1902.) The author reports the histories of 10 patients, ranging in ages from 10 weeks to 3 and 3-4 years; 4 of them suffered from pure spasmus glottidis, 6 from spasmus glottidis complicated with convulsions, or perhaps from convulsions alone. In all the cure was accomplished by removal of the vegetations.

The period of observation extended over 1 to 4 years. One child of 9 months showed especially well the relationship between the adenoid vegetations and the convulsions; the latter reappeared as soon as the vegetations returned, and did not completely disappear until they were removed. The author recognizes no contraindication to the operation on so small children, though without doubt such may present.

Fischer.

Laryngeal Symptoms Complicating a Case of Purpura Hemorrhagica.

JOSEPH S. GIBB, Philadelphia. (*American Medicine*, Oct., 18, 1902.) During the progress of the purpura, symptoms of laryngeal obstruction appeared the lumen of the larynx was much diminished and the landmarks obliterated. The submucous tissues were much distended, presenting the same appearance as in cases of edema. The mucous membrane was pale red. In the second examination an attempt was made to reduce the swelling, an application of ten per cent. cocain being first made, followed by 1-1,000 adrenalin. The patient was much relieved, and examination of the larynx afterward revealed a marked diminution of the swelling and an increase of breathing space.

This application was made at 5 p. m. At 9 p. m., of the same day, there was a return of the symptoms of laryngeal cyanosis, the patient growing rapidly worse and dying four hours later.

The author queries as to whether the adrenalin had any influence in causing the unfavorable symptoms.

Richards.

Low Lateral Pharyngotomy, for Approach to the Lower Portion of the Pharynx, Upper Portion of the Esophagus and Posterior Surface of the Larynx, With an Illustrative Case.

JOSEPH D. BYRANT, New York. (*Journal of the Amer. Med Ass'n.*, Oct. 18, 1902.) The operation was done for a tumor in the lower pharynx. Chloroform was administered and preliminary tracheotomy first done.

Incision was made on the right side from a point one inch below the body of the jaw, in a line corresponding to the thyroid cartilage, through the integument, superficial fascia

and platysma, to a point a little below the cricoid cartilage. The borders of the incision were held apart by traction loops, and the left greater cornu of the hyoid bone was pressed to right, bringing into prominence the right greater cornu, which was seized with a tenaculum and drawn firmly upward and held. By so doing the open space below was increased, the cornu was immobilized, and the inferior constrictor at the floor of the incision made prominent. Careful examination of the floor of the operative field disclosed the external laryngeal nerve lying quite vertically along the inferior constrictor, with the superior thyroid vein lying transversely somewhat higher up. The nerve was raised and laid aside, while the vein was tied between two ligatures and pushed aside. A half-inch incision was made through the thyrohyoid membrane, below the greater horn, avoiding the internal branch of the laryngeal nerve and the attendant artery, and into the pharynx.

The tumor was located posteriorly to the larynx and firmly attached to it. The tumor was next enucleated, leaving behind its membranous envelope. The growth was adherent to the right ala of the thyroid, through which it was removed with difficulty. The opening into the pharynx was closed with two rows of fine interrupted chromicized catgut sutures. "The superimposed structures were closed successively by buried catgut and superficial silk worm-gut sutures. A textile fabric drainage agent was introduced into the sac after the removal of the tumor, and the remaining portion of the external wound was lightly packed with gauze. The sac was treated by drainage and gentle washing. In a few instances fluid passed into the larynx and into the pharynx, but the sac rapidly became obliterated, and the external wound closed at the end of 19 days.

Patient was nourished by the bowel for the first three days; after this time fluid alimentation was given by the mouth till the end of a week, when a mixed diet was given.

The tumor weighed 425 grains and was fibro-muscular in character.

Richards.

Syphilis of the Larynx.

CHARLES M. ROBERTSON, Chicago. (*Jour. Amer. Med. Assn.*, Jan. 17, 1903.) The edges of the syphilitic laryngeal

ulcer are somewhat elevated, and after wiping away the secretion on the floor, persistent granulations are visible. As distinguished from tubercle this ulceration is larger in size, unilateral, and surrounded by an areola, while tubercular ulcers are usually bilateral, white, and have no areola. The superficial ulcer may appear simultaneously with the mucous patch or at any time from the second to the seventh year after the primary lesion by the breaking down of a superficial gummatous infiltration. The syphilitic ulcer is rarely seen in the stage of induration, its first evidence being as a clear-cut deep ulceration.

In its treatment, the author pushes the iodides to their tolerance, giving 5 to 15 grain doses of bromide of sodium when there is any tendency to iodide poison. This, he states, will often prevent the rash appearing. He starts with 20-grain doses, increasing it 20 grains every two days until tolerance is reached, and gives as high in certain instances as from 100 to 150 grains three times daily. In combination with the iodide treatment inunctions of mercury are given in the shape of blue ointment or the oleate, administered by rubbing a dram into different portions of the body daily, each dose preceded and followed by a warm bath. After the fourth dose the inunction is discontinued for a few days. In case the mercury disturbs the bowels, a small dose of opium may be added.

Richards.

The Diagnosis of Carcinoma of the Larynx.

OTTO T. FREER, Chicago. (*Jour. Amer. Med. Assn.*, Feb, 14, 1903.) All the various factors concerned in the diagnosis of cancer of the larynx are considered at length. The earlier the diagnosis can be made the better the chance for operative interference, as laryngotomies and endolaryngeal operations offer better chances of recovery than laryngectomies.

In removing portions of tissue for microscopic examination, the instrument should be crowded deeply into the growth and the piece taken from the center. The risk of infection or stimulation is not considered by the author as of much account compared with the possibility of the information which may be gained by a prompt and accurate diagnosis, and he does not find mention in the literature of any spe-

cial increase in the gland infection after the test excisions. The positive microscopic test is conclusive if properly performed; that is, with the microtome sections vertically to the surface of the fragment of tumor. A negative result should in most cases lead to further excisions until the diagnosis is certain.

Richards.

Laryngectomy for Carcinoma.

E. FLETCHER INGALS, Chicago. (*Jour. Amer. Med. Assn.*, March 7, 1903.) A case operated on by the late Prof. Christian Fenger is reported, in which complete laryngectomy was done with apparently successful result up to the time of the report.

The later statistics of all of the operations for carcinoma of the larynx are much better than the earlier ones. Out of 188 cases of total laryngectomy operated on between 1873 and 1894, there were 45 per cent. who died as the result of this operation, 32 per cent. of recurrences, and 12.7 per cent. of apparent cures; whereas, from 1890 to 1898, out of 81 cases there were 26 per cent. of apparent cures, 23 per cent. of recurrences, and only 18.5 per cent. of deaths apparently due to the operation. Formerly most of the deaths occurred from aspiration-pneumonia. This is now combated by operating with the hanging head, the use of the tampon canula, and by suturing the stump of the trachea to the skin. The operation is also done in the combined Trendelenburg and Rose's position, and the patient kept in this position for several days. This is the method used by W. W. Keen.

Richards.

The Treatment of Laryngeal Tuberculosis With Reference to the New Remedies.

Dr. TOVOTGYI (*Therapie der Gegenwart*, March, 1902) has tried a large number of the remedies lately recommended for laryngeal tuberculosis. The powder treatment seems to be usually ineffective; at most it was useful as adjuvant. This is true for iodol, iodoform, thioform, xeroform, nosophen. On the other hand, orthoform powder acts very well as an anesthetic. Formalin, 2 to 10 per cent. is valueless. Orthoform oil (25-150 olive oil) paramonochlorphenolglycerin, monochlorphenolglycerin, balsam of Peru, dissolved in colodion, has a weak action. On the other hand phenolum

natrio-sulphuricinicum is of great value especially in infiltrations. In ulcerations lactic acid in strong solution acts better. He saw little good in use of menthol. In every drug there was a stage where the action ceased. They must be alternated with intermissions of no treatment. The author alternates between lactic acid, phenol-sulphuricinicum, orthoform and menthol.

Levg.

A Case of Malignant Growth of the Larynx.

Mr. MAYO COLLIER (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903) said he exhibited this case as an example of how a serious condition may exist in the larynx without giving much trouble or inconvenience.

This man, aged sixty, was admitted into the North-West London Hospital complaining ostensibly of an abscess in the side of the neck opposite the cricoid cartilage.

His voice was hoarse; otherwise he had suffered no inconvenience, and was quite unaware that anything was wrong with his larynx. The abscess was evidently connected with the deep cervical glands which are associated with the laryngeal tissues.

An examination revealed a very large malignant growth almost filling the upper opening of the larynx, and extending into the left hyoid fossa.

Operative procedure, so far as the growth was concerned, being out of the question, tracheotomy was performed in anticipation of the obstruction to respiration that must sooner or later occur. The operation was one of extreme difficulty, owing to the swelling and infiltration of the tissues in front of the trachea. The patient was now quite comfortable with this supplementary opening in the trachea.

A Case of Pachydermia Laryngis.

DR. WYATT WINGRAVE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient, a male aged forty, somewhat plethoric in habit, suffered with hoarseness for six months or more. He afforded no evidence or history of syphilis or tubercle, but had always suffered with intermittent nasal obstruction, especially of late.

On examination, the larynx was found to be full of crusts, completely hiding the usual landmarks. These were first softened, and removed with a 10 per cent. solution of sodium

bicarbonate, which revealed a general epithelial thickening of the glottis, especially in the posterior commissure, which presented the usual "cock's comb" projection. The cords moved well. The epithelium gradually increased, giving the cords a "nibbled" appearance, but there was no actual ulceration.

A saturated solution of salicylic acid in alcohol was applied, and followed by a spray of the same dissolved with borax. This course reduced the epithelial deposit at once, and he is now steadily improving after intranasal and general treatment.

A New Growth Occupying the Glottis, and With Destruction of the Epiglottis.

DR. JOBSON HORNE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient, a laborer aged fifty-seven, attended at the Metropolitan Ear, Nose and Throat Hospital on account of a "sore throat" of two years' duration, with dysphagia and hoarseness.

On examination, a view of the larynx was obstructed by a growth the size of a small walnut, apparently springing from the right and posterior half. About two-thirds of the epiglottis appeared to be destroyed, and the stump was thickened and nodular. No enlarged gland was palpable. There had been no marked dyspnea, but the patient had recently had some bronchitis. A history of syphilis was not obtainable. Iodide of potassium had been given without effect upon the laryngeal condition.

A Case of Fixation of the Right Vocal Cord.

DR. JOBSON HORNE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) The patient, a retired jeweler aged seventy, attended at the Metropolitan Ear, Nose and Throat Hospital on October 11, 1902, on account of a "sore throat" and hoarseness. The history stated that the illness commenced quite suddenly, and was dated from a feeling of suffocation on rising one morning about four months previously. Thoracic pain had been experienced at night. There had been some dysphagia, but the amount of dysphagia complained of had been out of proportion to the loss of flesh that had taken place. He had previously attended at King's College Hospital and at the Central London Throat Hospital.

On examination of the larynx, the right cord was found fixed in the median position, and there was no intrinsic lesion to account for this. An enlarged and hard gland was readily palpable on dipping the finger into the right supra-clavicular fossa close to the sternal notch. The examination of the chest revealed impaired resonance in the second right intercostal space, and behind over the root of the right lung. A full sized esophageal bougie had been easily passed for 17 inches from the teeth.

The patient had not been seen very recently, having been kept from attending at the hospital by a relapse, ushered in by a "fit."

Tertiary Syphilis of the Larynx in a Man Aged Twenty-six.

MR. DE SANTI. (*Jour. of Laryng., Rhin. and Otol.*, Jan. 1903.) The man originally attended Mr. de Santi's Clinic in October, four years ago, with secondary syphilis. At that time the patient had a well-marked rash and the usual ulceration of the tonsils, soft palate and buccal mucous membrane. He also had a hoarse voice, and on examination was found to have a well-marked laryngitis, the latter presenting the usual mottled discoloration of secondary syphilitic laryngitis. He was put upon mercury, and topical applications were made to the larynx. The patient attended irregularly for some nine months, and, although the skin eruption and ulceration of the tonsils soon disappeared, the laryngitis remained obstinate. He had been advised to give up smoking and overuse of the voice, but did not observe these instructions.

The patient was lost sight of until October, 1902, when he again returned to the Westminster Hospital. He stated he had always had a hoarse voice since October, 1898, and that he had been under treatment at various hospitals, especially Golden Square. At the last-named institution he had been under Dr. Powell, who had put him on iodide of potassium, 40 grains, three times a day, and had applied various paints and sprays to the larynx. Dr. Powell had also on six or seven occasions tried to use endolaryngeal forceps.

The patient complained of a hoarse voice, some difficulty in breathing, and slight pain. Examination of the larynx showed both cords ichronically inflamed, especially the left.

On the left cord was a large, firm, red outgrowth or excrescence; in the interarytenoid space was a large swelling which presented cicatricial changes. The cords could not be properly approximated owing to the growth on the left vocal cord.

The patient was brought before the Society on the question of treatment. He had undergone a long course of large doses of iodide of potassium, topical applications to the larynx, and even attempts to remove endolaryngeally some of the outgrowth from the cord, but without any apparent benefit. He now had both pain and difficulty in breathing, and bearing in mind the course these cases of tertiary syphilis of the larynx were apt to follow, the question arose as to the advisability of performing a thyrotomy, and removing the diseased intralaryngeal area.

Case of Removal of the Epiglottis for Tuberculous Disease.

RICHARD LAKE. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The prominent symptom in this case had been intense dysphagia, for which reason the epiglottis had been amputated over four weeks ago by means of the galvanic-cautery snare. When removed it was found to be nearly half an inch thick where cut through, and the posterior or laryngeal surface was deeply ulcerated. The rest of the larynx was diseased, and had not yielded entirely to treatment, but the stump of the epiglottis was soundly healed and of normal thickness. Dysphagia ceased immediately after the operation, and did not recur. The general condition of the patient was markedly improved since he had been able to take his food in comfort.

Pedunculated Laryngeal Growth, Probably Dating from Birth, in a Boy Aged Fifteen Years.

DOLAN. (*Jour. Laryng. Rhin. and Otol*, Jan., 1903.) There were two growths present. The large one probably began as a papilloma arising from the upper surface of the anterior part of the left vocal cord, and had in the course of years become fibrous and pedunculated. The smaller tumour was sessile, subglottic, and situated immediately below the anterior commissure. The mother thought the affection dated from birth, as from the first he had had a peculiar hoarse cry, and in voice had always been hoarse. The large growth and

its peduncle in each inspiration was drawn through the glottis which they momentarily filled almost completely. The influence of this respiratory obstruction, acting through so many years, showed itself in the stunted and anemic appearance of this youth, while the other members of his family were healthy and well grown.

A Case of Cancer of the Larynx Cured by the X-Rays.

W. SCHEPPEGRELL (*N. Y. Med. Journal*, Dec. 9, 1902) reports that the patient was 57 years old, and that for six months he had been hoarse. Examination of the larynx showed a tumor of the left wall revolving vocal cord. A month later ulceration had set in, with profuse expectoration and much pain. Twenty daily applications of X-ray were used—(a high tension Tesla coil and tube with medium vacuum-platinum reflector at distance of seven inches from neck—ten minutes each sitting).

The improvement was not immediate, except pain disappeared, but two weeks after cessation of treatment, all ulceration had been relieved, expectoration ceased and patient was preparing to resume his profession three months later. There had been no recurrence.

Harris.

Laryngectomy for Malignant Disease.

FRANK HARTLEY (*N. Y. Med. Journal*, Dec. 13 and 20, 1901) discusses the subject exhaustively, reporting five cases, all successfully operated upon. In three of these cases there had been no recurrence at the end of four years. One was a recent case and one died 18 months later with deep seated cervical metastasis. In three of the five cases, the voice had been preserved.

Harris.

Tuberculous Laryngitis.

J. CLARENCE SHARP (*N. Y. Med. Journal*, Feb. 7, 1903) is a believer in the value of very conservative local treatment. In seven cases treated, two by creosote injection, three by creosote and morphine internally, and two by morphine alone internally, the best results followed the internal use of creosote and morphine.

He divides the ulcerations into two classes "first, cases where the ulceration is confined to the true cords, ventricular bands and interarytenoid commissure without infiltration of the surrounding structures. Second, cases with ulcer-

ation of arytenoids. aryepiglottic fold, true cords and ventricular bands, with infiltration or infiltration without ulceration."

He believes the prognosis for the first class is good even on Manhattan Island. For the second, removal to a high altitude is the only chance, and if extensive ulceration exists death will occur in three to six months. Such cases should not be sent away.

The writer calls attention to the possibility of mixed infection. He recognizes also the possibility of a simple hyperplasia of the interarytenoid commissure, occurring in pulmonary phthisis. (This view is at variance with that held by most observers, viz: that all laryngeal inflammation in tubercular patients is to be regarded as tubercular.—Reviewer.)

Sharp uses for the cases without marked infiltration of the arytenoid and ary-epiglottic folds larger doses of creosote internally and with more success—even as high as 50 drops of beechwood creosote, t.i.d. well diluted. He advises against any spraying of the larynx. *Harris.*

V.—MISCELLANEOUS.

The Involvement of the Concha and Larynx in Hemiatrophia Faciei.

KORNER. (*Zeitsch. f. $\frac{5}{3}$ Ohrenh.*, 41 Bd.) The author observed a case of monolateral atrophy of the face, with especial involvement of the corresponding concha. At the same time an atrophy and fixation of the corresponding vocal cords in the median position was observed, which was manifested only in loss of the singing power. *Levy.*

Experiments in the Action of Suprarenal Extract on the Mucous Membrane of the Upper Air Passage, in External Application.

BUKAFZER (*Arch. f. Laryngol.*, Bd. 13) used the preparation isolated by Takamine in carrying out the physiologic experiments. He found that its action was limited to the capillaries at the point of application. The veins and arteries were emptied only when the layer covering them was re-

moved, and then centrally from the point of application. It was thus proven that the capillaries possess an active power of contraction. He was able to watch microscopically these changes on the web of the frog. *Levy.*

Anesthesin.

A. SPIERS. (*Muenchener. Med. Wochen.*, 1902, 39.) Anesthesin is a new local anesthetic related to orthoform. It is almost insoluble in water, but easily in alcohol and ether. Taken internally it is non-poisonous in doses up to 2 grams. It does not cause the complete anesthesia of cocaine, but its effect lasts hours and even days, and also occurs without loss of substance. It is very well adapted for postoperative treatment. The author thinks that in addition to its anesthetic properties it hastenes the healing. In 3,000 cases orthoform caused a severe eczema in 12 and anesthesin in only one case. Insufflated in the form of powder, it had a favorable action on whooping cough and often cut fresh colds short. In postoperative treatment of the pharyngeal, palatal or lingual tonsils, and in the larynx, it eased the pain and shortened the period of healing. *Levy.*

The Choice of a General Anesthetic in Nose, Throat and Ear Operations.

THOS. J. GALLAHER, Denver, Col. (*Jour. Amer. Med. Assoc.*, Mar. 21., 1903.) The author has found bromide of ethyl to be very satisfactory for throat operations. It produces anesthesia in about one minute, which anesthesia lasts from two to five minutes. The amount required varies from one to four drams, according to age. The entire quantity to be given is thrown on a towel or in an inhaler, placed over the patient's nose and mouth, and no air is admitted except in case of asphyxiation. Anesthesia is complete in about one minute, by which time the breathing is stertorous. In adults it requires a larger dose and more time. A temporary vasomotor dilatation occurs and vomiting frequently follows. It should be administered when the stomach is empty. One death in 5228 narcoses has been reported. Only pure bromide of ethyl should be used. *Richards.*

The Early Appearances, Diagnosis and Treatment of Tuberculosis of the Upper Air Tract.

WALTER F. CHAPPELL, New York. (*Jour. Amer. Med.*

Assoc., Feb. 21, 1903.) The author has observed in cases seen at the Loomis Sanitarium that the mucous membrane of the soft palate, larynx and pharynx is extremely pale, and this condition has remained from two to six years without any deposit in the upper air tract.

Pharyngeal tuberculosis he regards as usually secondary to pulmonary or laryngeal tuberculosis; cases, however, do occur in which tubercle bacilli are present and the manifestations of tubercular pharyngitis undoubted, but in which examination of the lungs does not reveal any disease. In one such instance the kidneys were the seat of the tubercular process. At the beginning of pharyngeal tuberculosis the mucous membrane has first a pearly-gray, tense appearance and is later covered with minute yellow spots; small ulcerations then appear, later coalesce, finally leaving large irregular ulcerating surfaces.

He thinks considerable can be done medicinally in these cases of tuberculosis of the upper air tract. He is opposed to the use of any irritative applications during any active process, relying entirely upon soothing and cleansing sprays and applications of iodoform and fluid benzoin, the benzoin preparations being of special value on account of their property of clinging to the mucous membrane for hours. During the period of quiescence the ulcerations may be treated with solutions of lactic acid of varying strength. The curette is not a good instrument, inasmuch as after its use there is frequently swelling and an apparent extension of the disease, and he now employs the curette only for the relief of dyspnea and dysphagia in advanced cases, for the removal of the tumefied tissue, and for the scraping of ulcerations during the quiescent period. In the latter case he uses a dull curette after cleansing and cocainizing the surface, taking care not to cause any bleeding. He has known a number of throat infections entirely arrested by climatic measures alone. Residence near the sea or any large body of inland water is a bad place for tubercular throats. *Richards.*

Acute General Infections Originating in the Lymphoid Tissue of the Upper Respiratory Tract.

HENRY L. SWAIN, New Haven, Conn. (*Philadelphia Medical Journal*, Dec. 13, 1902.) The author regards many

of the febrile attacks of children that come on in the late afternoon or evening with temperature varying from 102 to 104, and extreme restlessness, lasting for several days, and followed by a condition of general anemia and debility, due to acute infectious inflammation of the pharyngeal tonsil. This may occur in children who under normal conditions are nose-breathers and whose adenoid tissue is not necessarily completely obstructive. These cases, he thinks, are frequently wrongly diagnosed; in fact, the absolute cause is entirely overlooked by the family physician, who thinks of beginning infectious disease or pneumonia, or examines the blood for typhoid or malaria. Accompanied by this condition is a cervical adenitis and considerable obstruction of nasal respiration.

Richards.

Removal of Foreign Body From the Esophagus.

R. J. WARD, East Barrington, N. H. (*American Medicine*.) The foreign body was a fish bone lodged in the esophagus, just below the larynx. In the absence of any probang, a snarl of grocer's twine was swallowed and then withdrawn. The fish bone became caught in this, and on the removal of the twine came back with it. The bone was an inch long.

Richards.

Social Hygiene and Social Politics.

STEINER (*Wiener Med. Blätter*, Nov. 28, 1902) has examined the statistics in the children's division in the Polyclinic in Vienna, and has come to the following conclusions: The results of serum treatment have been as favorable during the past twelve months as in any other year. Variations in mortality do not occur now as in the ante-serum period. The duration of the disease is shorter than formerly, about 8 days on the average. Complications and sequelae are much rarer, and are of a more benign nature. The mortality is relatively slight, 6.3 per cent. From the use of concentrated serum, the occurrence of unpleasant accidents after the injection of the serum is avoided.

Goodale.

A Case of Nevus Involving the Uvula, Palate, Fauces, Tongue and Larynx.

P. H. ABERCROMBIE. (*Jour. of Laryng., Rhin. and Otol.*, Jan., 1903.) Miss M. P—, aged eighteen years, attended the Central Throat, Nose and Ear Hospital on April

19 last complaining of "sore throat," especially on the left side, of a few days' duration.

Examination at once revealed a nevoid condition of the left side of the throat, involving half the uvula, the soft palate, the anterior pillar of the fauces, the side of the tongue, the epiglottis, and arytenoid region. There was also a red patch on the right anterior faucial pillar, and another on the under surface of the tongue.

The left tonsil was slightly inflamed, and this, no doubt, was the cause of her sore throat. For this a mixture of salicylate of soda and potassium bromide was prescribed, and speedy relief followed in a few days.

She was frequently troubled with similar sore throats, and the left side was always the worse. The naevus had been known to exist for the last sixteen years, and her mother said that it had increased in area during that period. It was discovered accidentally by her mother, who happened to look into her mouth one day.

There was often slight difficulty in swallowing, which was worse at the monthly periods. There was no family history of nevi; the patient's mother suffered from "rheumatic" pains. The general health was good; she had had measles twice, at five and seven years of age, whooping cough when between two and three years old, and scarlet fever ten years ago. The patient was shown as illustrating an interesting and not very common throat affection.

A Case of Paralysis of the Abductors of the Vocal Cords and of the Palatal Muscles, and Slight Paresis of the Tongue.

DUNDAS GRANT. (*Jour. Laryng., Rhin. and Otol.*, Jan., 1903.) J. W——, aged twenty-five, was first seen in March, 1900, on account of cough and groaning sound when in bed. The condition had lasted two or three months, and had come on after an attack of hiccough lasting on and off for about ten days. He had had a cough on and off for about one year, especially when drinking quickly. For six months he had occasional stridor on inspiration. Examination of the throat revealed slight paresis of the right half of the palate, but no abnormality in the movements of the tongue. The vocal cords approximated during phonation, but on inspiration the vocal processes did not move

from the middle line. There was, however, an elliptical slit between the cords. The case was obviously one of paralysis of the abductors and internal tensors of both cords and paresis of half the palate, and the lesion was therefore, in all probability, one of the vagus nerves in or near the medulla oblongata.

In seeking for a cause, especially for any signs of syphilis, there were found enlarged post-cervical glands of about six months' duration, and a flat ulcer on the scalp of the parietal region, with slightly indurated edges. This was asserted to have been in existence for nearly three or four months, but it seems more probable that it preceded the enlargement of glands. There was also general enlargement of the lymphatic glands over the body. The pulse almost disappeared during inspiration; the knee-jerks were normal. An antisyphilitic course of treatment was instituted, and when seen a fortnight later it was reported that there was less noise in sleep since the second occasion on which the mercurial ointment was rubbed in; the vocal slit appeared to be rather wider during inspiration. There was some degree of mercurial stomatitis.

The patient disappeared from the observation of the reporter, but returned again a fortnight ago—namely, more than two years after being first seen—on account of great difficulty and marked inspiratory stridor, also such a degree of paralysis of the palate that fluids usually regurgitated through the nose when he drank, while his speech was so indistinct that he was obliged to pinch his nostrils in order to make himself understood at all. The protrusion of the tongue into the right cheek was not quite so strong as into the left; he was unable to channel the tongue, but was not aware of ever having been able to do this. He stated that under the previous course of treatment he recovered sufficiently to be able to attend to his work as a butcher; he was at present, however, unable to do so. He was again placed on antisyphilitic treatment, and when seen a week later reported slight improvement in the breathing and greater ease in speaking. At his last visit he drew attention to the fact that he had a difficulty in raising his left arm, but he had left the out-patient department before an investigation of this symptom had been made. It remains to be seen

whether or not this is due to paralysis of the muscles supplied by the spinal accessory. The reporter would be glad to have suggestions as to the possible source of infection, as there is nothing to give color to the idea that it is hereditary, and there is no history of genital infection. It seems possible that the ulcer on the head was developed at the site of the primary sore, but the early development of the nervous symptoms would in that case be remarkable.

A Case of Obscure Lardaceous-looking Variable Infiltration of the Uvula, Soft Palate, and Right Arytenoid Cartilage.

FELIX SEMON. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) The patient was first seen on July 12 of the present year, with a history of long-standing throat trouble and occasional difficulty in swallowing. She had been seen by various medical men, all of whom, according to her statements, had considered the affection as rather serious, but had apparently not known what to make of it.

On examination, an almost lardaceous condition of the uvula was seen; that is to say, the uvula and the adjacent parts of soft palate were considerably infiltrated, and at the same time quite smooth to sight and touch, whilst the most characteristic point consisted in the peculiar yellowish color of the affected parts, reminding one of nothing so much as of the appearance of a kidney which had undergone lardaceous degeneration. In the larynx there was a similar condition of the mucuous membrane over the right arytenoid cartilage. The left looked slightly more edematous, reminding one of the ordinary pseudo-edematous infiltration of tuberculosis; still, although more transparent than its fellow, it had a similar yellow color to the right arytenoid.

There was no evidence of kidney trouble, but on examination of the legs there was slight pitting on pressure, particularly over the external malleoli.

Her voice was normal. There was no pain, and no difficulty in breathing. The organs of the chest were normal.

The urine had been examined later and found perfectly normal. On July 14, 1902, the local condition of both pharynx and larynx was much better than three days previously. The patient was given an arsenic and iron mixture.

On July 29, 1902, the swelling both of the uvula and of

the right arytenoid cartilage was much more marked than on the occasion of her last visit, and the color was much more the characteristic lardaceous yellow which had been observed on the occasion of the first examination. The condition apparently varied from day to day.

On November 6, 1902, the patient was found to have been distinctly better since last seen, and had only occasionally had slight difficulty in swallowing. The uvula as well as the right arytenoid cartilage now looked much less infiltrated than they were in July.

Remarking on this case Sir Felix Semon said: "This is the third case of the kind which I have ever seen, and I am not aware that the condition has ever been described.

"My first case, which I saw very many years ago, occurred in the wife of a practitioner in the Midlands; the lady's age was about thirty. In her case the condition was much more marked and general than in the present one, and I at first thought that it was a case of tuberculous infiltration, distinguished only from the ordinary cases by the peculiar yellow color of the affected parts, as the infiltration involved not only the uvula and soft palate, but also the epiglottis and both arytenoid cartilages. In that case the general discomfort and the difficulties in swallowing were much greater than in the present case, and no method of treatment had any effect whilst the patient was under periodical observation, which extended over nearly two years. I was, therefore, not a little surprised when again, about two years afterward, the patient called on me to show me that there had been a return to perfectly normal conditions. There was as little known cause for the restoration to health as there had been for the original affect on.

"The third case, which also occurred in a lady, aged about forty, I only saw once. In that case the conditions were very much as in the patient now shown.

"I cannot make the least suggestion as to the pathology of these cases, and bring my case forward with the double purpose of giving the members of the Society the opportunity of seeing these most unusual conditions, and of possibly obtaining some help with regard to its pathology and treatment."

Case of Epithelioma of Tongue.

HAMILTON BURT. (*Jour. Laryng., Rhin. and Otol.*, Jan. 1903.) Patient first noticed a depression under the right side of tongue in February last, about the size of a pin's head. It appeared as though the part had been punched out or sucked in. On the floor of the depression she noticed a small white deposit. She took little notice of it. It grew very slowly, and was painless. She sought advice about three months ago, and was advised to have some stumps and bad teeth in the vicinity of the growth removed. This was done, but no improvement was noticed. Dr. Burt had first seen the patient about four weeks ago; the growth was then the size of a small cherry, and occupied the right side and upper part of the middle of the tongue; the base was indurated, and the surface smooth, not ulcerated, with a few tiny yellow spots scattered here and there, out of which, when squeezed, a yellowish fluid escaped. No enlarged glands could be felt. Taking into consideration the age of the patient, the appearance of the growth, and the absence of enlarged glands, she was put upon iodide of potassium and mercury iodide, being increased to half a drachm three times a day. Under this treatment the growth became considerably reduced at first, but in spite of the increased doses of iodide it had increased rapidly during the past ten days. The patient had not lost flesh.

On the Local Action of Tri-Chlor-Acetic Acid.

SCHWABE, Breslau. (*Archives of Otology* Vol. XXXI, No. 5.) Trichloroacetic acid, when applied to the mucous membrane of the nose or the tonsils, produces a superficial effect, which does not extend to the deeper layers of the cellular tissue, unless the action of the acid is supported by mechanical measures (repeated rubbing). Owing to its property of destroying the epithelium, it is an excellent means for bringing about closure of old perforations of the Mt.

After galvano-cauterization, application of the acid clears the openings of the epithelial crypts, glandular ducts, etc., and thus acts as a protective against bacteria.

In nasal hydrorrhea, e. g., hay fever, on account of being non-irritating, it gives excellent results by mechanically confining the secretion, through closing the glandular ducts on the epithelium and perhaps also on the basement membrane.

Campbell.

BOOK NOTICES.

Text Book of Diseases of the Eye.

By Prof. L. Jacobson and L. Blau. 3rd Edition of Jacobson's text book. Leipsig. Printed by Geo. Thieme, 1902.

A third edition of Jacobson's well known text book on diseases of the ear has appeared. The author has had Blau help him in order to be able to review the enormous literature of the last 5 years. In this way it was possible for the author to collect in the narrow confines of a text book everything that belongs to otology. Certain chapters, e. g., that which treats of the complications of otitis media suppurativa have been almost entirely rewritten on account of the rapid development of that subject in the last few years. The thoroughness of the book, its wide survey and the precise form, the impartial, purely scientific critique of the opinions of other authors are completely retained. Of special importance to the general practitioner is the treatment in a special chapter of the aural complications of constitutional diseases like measles, scarlet fever, diphtheria, influenza, pneumonia, diabetes, etc. The specialist will find especial value in the completeness of the contents, the exact and careful description of all technique and operation procedures and the convenient and complete literature. Jacobson's text book will certainly add an increased number of friends to the already large number. LEVY.

Hygiene of the Ear in Health and Disease.

Prof. Haug. Published by G. H. Moritz, Stuttgart.

In the list of books on Hygiene given out by Rubner is one from the pen of the head of Munich university polyclinic for diseases of the ear, Prof. Haug. This is of interest not only to the laity, for whom it was originally intended, but also for the physician, even the otological specialist. It comprises in 100 pages in a concise but entertaining manner what ought to be known about the ear in health and disease. The anatomy and physiology are treated in two introductory chapters. In section III the author lays special stress on the importance of hearing in the mental development of the

child as well as for the adult in relation to his surroundings in active life, but especially on the great danger of suppuration of the ear. While one chapter contains the pathology of ear diseases six are devoted to prophylaxis. The author gives in minute details the dietetic regulations which the aural patient must observe, as well as the technique of syringing, catheterization on whose correct performance much stress is laid. The patient would be spared many ill consequences and the physician much worry if this chapter would be read carefully. In the last three sections the author treats of inherited difficulty in hearing, the relationship of ear disease, insurance and deaf mutism. In the interest of the numerous ear patients, we wish the book a wide circulation. LEVY.

The Nose and Throat in Medical History.

By Jonathan Wright M. D., Brooklyn, N. Y., 8 vo. Cloth and Gold, 250 pages, 10 illustrations. Price \$2.00 net. Published by the Laryngoscope Co.

Jonathan Wright has done a great deal in the literature of laryngology which in more ways than one has elevated the American side of the subject. It is fair to say however that he has written nothing better than *The Nose and Throat in Medical History*. He is particularly effective in this work, affording as it does an unusual opportunity for his well known faculty of critically surveying the field of his work.

The plan upon which he constructs his history is particularly happy. Each division of the subject is considered separately.

Thus the main groupings are Egyptian Medicine, Chaldean Medicine, Medicine of the Parsees, Medicine of the Talmud, Hindoo Medicine, Præ-Hippocratic treatises from Hippocrates to Celsus, Roman Medicine, Celsus and the Præ-Galenic writers, Galen, Greek writers of the Eastern Empire, the Arabians, the Præ-Renaissance period, the Renaissance, the Reformation and the diffusion of Medical Science, The result of the Renaissance, Intranasal Surgery and Pathology of the Seventeenth and Eighteenth Centuries, The Nineteenth Century, Præ-laryngoscopic Era, the Laryngoscope, Problems of the present.

With such a classification as a frame work it is clear at a glance that the work is a distinct contribution to the literature of the Nose and Throat and should therefore find a place in the library of every one who devotes his time to the study and practice of laryngology.

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IS ATROPHIC RHINITIS ALWAYS AUTOCHTHON-
OUS? THE NECESSITY OF ESTABLISHING AN
EXACT DIAGNOSIS IN ORDER TO DETER-
MINE THE TREATMENT.*

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AT MADRID.

Although I recognize the great honor offered me in the cordial invitation to open the discussion on ozena, and although I comply with pleasure in spite of the many difficulties to be overcome in traversing the great distance between this country and my own, I confess that I do so with a certain fear, because the results of my researches still lack the contributions and confirmation of other investigators.

Before I undertake to unfold my theory to this honored assembly, allow me to present a short survey of the work

*Opening of a Discussion, read by invitation at the Fourteenth International Medical Congress (Section on Laryngology), Madrid, 1903.

thus far accomplished in this field. Years ago Sauvages and Tillot propounded the theory that congenital narrowness of the nasal canals was the cause of ozena and that dysodia and fetor were generated by the retention of great quantities of moisture. That this is fallacious was pointed out by Gottstein* who showed that a stenosis of the nasal cavities cannot possibly create a stench. We have only to recall polypi that at times make the nose entirely impassable to currents of air, and where the discharge of secretions is accomplished by the greatest effort—and yet no ozena is present.

Then the abnormal width of the nasal fossae was made responsible for ozena. This theory, represented especially by Gottstein and Paul Heymann,† seems more plausible than the one preceding, only they mixed cause and effect. That wide nasal fossae alone do not lead to ozena we learn from experience, as B. Fraenkel long since brought out and as we all now know.

The view of Zaufal, that we have to deal with a rudimentary condition of the inferior and middle turbinals, is not recognized by most authors since the investigations of Zuckerkandl. To this theory I can only agree in part, for among the many thousands of children I have examined, I have never seen an instance of this anomaly. And yet we must think of a certain condition existing. I must use this word condition or tendency, although I cannot as yet tell you what it is. But *something* is inherited in these cases just as in tuberculosis, without our being able to clearly define what it is. Whenever a weakness exists in the parents it is often enough present in the descendants.

Rosenfeld reports a family of 21 members, 15 of whom suffered either from ozena or atrophic rhinitis. He believes that these cases must be regarded as due to infection—a view in which Cholewa does not agree, believing rather that they were hereditary. From the following history of a similar family, occurring in my practice, I am obliged to think that Cholewa is not entirely wrong.

Mrs. S., a descendant of an old Virginia family, suffered from severe ozena. She stated that her mother and grand-

*Berliner klinische Wochenschrift, p. 554, 1878.

†Deutsche Medicinalzeitung, p. 550, 1886.

mother had been victims of the same disease. Her five children scattered at an early age to the four corners of the earth; her oldest daughter left her home at the early age of twelve. She had only a slight catarrh up to her seventeenth year, from which time up to the present day she has been tormented by the most shocking stench. The whereabouts of the second child is unknown; the third and fourth (both girls) are now married and both suffer from ozena, although they were separated from the mother since their 13th and 14th year respectively. The last child, now a young man of 21, came to me a year ago with an exostosis of the left side of the nose, which completely prevented respiration through that side. I removed it and now he suffers from a pronounced rhinitis atrophica on both sides. A child of the second daughter, a four-year-old boy, was brought to me a year and a half ago with marked adenoids, which were immediately removed. The boy now 5 1/2 years old, shows a clearly defined atrophic rhinitis.

Another grandchild of the above mentioned Mrs. S., 10 years old, suffers from incipient rhinitis atrophica. We have here, then, a family of ten people who did not live together, nine of whom suffer from ozena or atrophic rhinitis, and among these a child of 5 1/2 years with advanced atrophy, such as I have seldom seen in so young a child. This all surely argues more for heredity than for infection. But only in this sense can we speak of a *tendency* or disposition to a disease, since a part of the body, debilitated for past generations, as in this instance the interior passage of the nose, will be generated weaker than in an organism born entirely normal, and will more easily fall victim to the habits inherited in certain families.

Passing over a number of other theories, we come to the theory of infection and the so-called "Herd" theory. Both offer much that is of value, and both explain, in the most simple manner, the very serious problem of ozena. They free us from so many of the difficulties, the latter even promising us a cure for our ozena patients, that we must be grateful we have at last reached the long-sought-for goal. But, unfortunately, I cannot agree with either of these theories, and later I beg leave to explain my own idea, even at the risk of

irritating, by a new theory, the already highly sensitive and sarcastic brain ganglia of my most honored colleague Grünwald.

I confess it is very tempting when just those men who have done most in the field of accessory sinus disease, as for instance Grünwald and Hajek, came out in favor of sinus disease as a cause. Consequently I watched for years and am still watching for the existence of accessory sinus suppuration in cases of ozena. Very soon I found just such a case, which in short is as follows:

A. F., 10 years old, is the oldest of four children; the other three are healthy. She had measles and a severe attack of scarlet fever, and suffered for the past six months with a bad odor from the nose. I found the nose coated with the characteristic scabs, more plentifully on the right side. These having been thoroughly removed, I could ascertain the presence of an empyema of the right maxillary sinus. In addition I found wide nasal fossae, a very marked atrophy of the mucous membrane and turbinated bodies on both sides, and only the middle turbinal of the right side hypertrophic. A foul odor was also present. Under general anesthesia I opened the antrum of Highmore and evacuated considerable ill-smelling muco-purulent fluid. After a thorough scraping of the entire cavity and daily syringing of the same with boric-acid-solution, an astonishing decrease in the odor followed. After eight weeks the secretion from the antrum ceased and I closed the wound. A week later I saw the child again and she presented, on the whole, the same appearance as before the operation, that is unusual scab formation and stench. An examination of the ethmoid cells and of the sphenoidal and frontal sinuses gave no evidence of an empyema, so that I desisted from opening the same. The child, now a year since her first visit to me, feels much better than in the beginning, but this is due solely and entirely to the strict treatment carried out daily by her mother. I am convinced that were we to omit the treatment for one week the characteristic odor would soon return. In order not to lay myself open to the reproach from Grünwald and Hajek, of having made a superficial examination, as has happened to others, I not only did my utmost to be thorough, but was well

pleased when the mother, owing to the hopeless condition of her child, proposed consulting other laryngologists. The earnest efforts of two well-known colleagues altered nothing; the ozena stayed as it was, while the empyema of the antrum of Highmore remained cured.

But perhaps one single case does not prove anything; I always consider the possibility of self-delusion. Anyone to whom the last case is not convincing must ask himself: "Is the rest of the entire laryngological world deceived also, and only the few men who defend this so-called sinus theory, such men as Luc, Guye, Bresgen, Robertson, and especially Grünwald and Hajek, are they alone correct?" Are colleagues like Chiari, Krieg, Cholewa, Cordes and many others still to be accused of superficial research? It is hardly possible for me to accept such a proposition. Nevertheless, I wish to mention the case of Richard,* who proved the existence in one patient of ozena associated with an empyema of the sinus frontalis, and who was able to relieve the latter without being able to change in the least the symptoms of ozena. Certainly these cases indicate that affections of the nasal cavities have only indirect connections with ozena. I can easily imagine that through some external cause, as for instance in rinsing the nose, the secretions might perhaps accidentally reach one of the accessory cavities, stagnate there and arouse a purulent inflammation. The reason this inflammation is almost always a purulent one and not ozenatous lies in the fact that the nasal sinuses, as we will see later, are not sufficiently prepared for the ozena process.

If in reality the sinus affection were the primary cause, the coincidence of both diseases would occur much oftener. Let us assume that the sinus affection is the primary cause in a case of ozena of ten years duration. Can you possibly imagine that the primary seat of affection in the accessory sinus would remain so small, after ten years existence, that it could be overlooked, even by experienced laryngologists? No; when ozena and accessory sinus disease exist side by side, then ozena is the primary cause and the empyema the effect—or, let us say more reservedly, an accompanying condition.

* *Revue Hebdomadaire de Laryngologie*, No. 38, 1900. Quoted from J. Wright.

But post mortem findings further disprove the so-called "Herd" theory, not only the earlier researches of Krause, Hartmann, etc., but also the thorough recent investigations of E. Wertheim.* The latter found in the accessory sinuses the usual condition of inflammation, namely, deep-reaching subepithelial round cell infiltration and hemorrhages. "It is hard to believe," he says very properly, "that a purulent process of the accessory sinuses with exactly identical condition of the mucous membrane and the same localization should lead to directly opposing processes in the nose—the formation of polypi—and to atrophic conditions. Furthermore, the process in the nose gave the impression of being much older than the changes in the mucosa of the sinuses." Wertheim never found atrophy of the mucosa of the sinuses. Such facts, in my opinion, should not be overlooked.

As far as the different diagnosis is concerned, I consider it important that the patients themselves, in accessory sinus disease, find the stench exceedingly unpleasant, often before anyone else can detect the existence of the same, whereas the ozena patients are never annoyed by their own odors. This shows that in the former case the filaments of the olfactory nerve are preserved, while in the case of ozena they are already destroyed. In other words, in accessory sinus disease the mucous membrane of the nose is affected secondarily, while in ozena it represents the original seat of the disease. I am aware that arguments might be brought forth against this opinion, but I agree with Jurasz in saying that the subjective perception of smell should not be overlooked.

I am unable to believe that the numerous cases of atrophic rhinitis with the formation of scabs yet absolutely no sign of the characteristic odor of ozena, can have sinus disease as the primary cause. I have seen too frequently, that such cases improve under proper treatment—yes, that the symptoms even entirely disappear under changed hygienic conditions. This never occurs in accessory sinus disease,

Furthermore, I should like to remark, what Rethi has also mentioned, that the fetor in accessory sinus disease is not at all lessened, or only imperceptibly so, through the use of

* *Erkrankungen der Nasennebenhöhlen. Archiv. für Laryngologie, Band XI, 1901.*

Gottstein's tamponade, while in ozena it diminishes rapidly. So much for accessory sinus disease.

We now come to the so-called infection theory, which explains these matters more easily, and carries us in the most off-hand manner over all difficulties. There has been much time and trouble given by renowned colleagues to the development of this theory, and I need only to mention names like Loewenberg, Luc, Massei, Klamann, Thost, Perez, Pelaez, Marano, Struebing, and especially Abel, in order to remind you of the earnestness of their researches. Loewenberg deserves the credit of having been the first to work in this field. After him came a succession of others, among whom I wish especially to mention Perez* and Abel.† They all accept as the cause of these peculiar secretions and scab formations, a bacterium which is now universally designated as the *bacillus mucosus capsulatus* (Abel). Fricke‡ says this bacillus represents a group of bacilli which should be considered as varieties of one species, namely, the bacterium of Fiedlaender. That the disease tends to affect adjacent mucous membranes, Massei thinks argues for the contagiousness of ozena. It advances then by means of some auto-infection; for, as is well known, in ozena patients the larynx is also affected, probably owing to the aspiration of the bacilli. There remains no doubt, however, that the process advances not only downward but upward. As proof of this I wish to mention an observation of Maklakoff, Jr.,§ who in affections of the eyelids, isolated from the pus a bacillus very similar to that of the ozena bacillus. At the same time an examination of the nasal mucosa showed the same bacillus.

Now, however, we must not forget that ozena bacilli may be found in different localities without a specific affection

*Fernand Perez, *Recherches sur la bacteriologie de l'ozene*. Annales de l'Institut Pasteur, No. 12, 1889.

†Rudolf Abel, *die Aetiologie der Ozena*. Zeitschrift fuer Hygiene und Infektionskrankheiten, Bd. 21, 1896.

‡Carl Fricke, *ibidem*, Bd. 23, pag. 440.

§A. A. Maklakoff, Jr., *Zur Bakteriologie der chron. eitrigen Entzuendung der Glandulae Maibomii des Lides*, Archiv. fuer Augenheilkunde, Bd. XLIII. Heft 1.

necessarily existing. One finds them in noses in which neither scab formation nor atrophy is present. And here one can say with Martin Hendelsohn* that wherever Abel's bacillus is found, sooner or later ozena will make its appearance, and so represents a latent form, as for instance in tuberculosis. The justification of this for Koch's bacillus, Hendelsohn continues, has been proven by clinical observation of innumerable cases, which still remains unproven for the coccus of ozena.

I will discontinue the discussion of this part of the subject as later I shall have to renew it, and with your permission will explain more fully my own views.

B. Fraenkel was the first man who tried to prove that there was a connection between the origin of ozena and atrophic catarrh by means of dessicated secretions; in addition to this, there was the specific decomposition of the latter. That is exactly my opinion to-day.

If we consider the first of these causal factors, the atrophic catarrh, we must immediately inquire why the atrophy appears just in the nose and how it is brought about. It seems as if we must answer this question in order to get a clear insight into the essential nature of ozena. Whence, then, comes the atrophy of the entire nasal interior, the bones, mucous membrane, etc.? In the first place, and above all, must be mentioned the influence of our artificially created climate, and especially the warm, dry air we inhale the greater part of the year. This represents the first step towards atrophy. I have explained elsewhere that by climate in this sense, we must not understand the out-door atmosphere, but the artificially produced atmosphere of our dwellings. We must remember that the modern man does not live in the open air, but in closed rooms. And you yourselves, gentlemen, do you not live at least 23 hours of the day in your rooms and on an average of one hour a day out of doors? We will meet with the same deleterious results at the sea shore or in the dry climate of the interior, providing the conditions for the generation of a bad *indoor climate*, if I may call it so, remain the same. Already 26 years ago

*Martin Hendelsohn, Ueber Ozaena, Etc. Monatschrift fuer Ohrenheilkunde p. 330, 1897.

Krieger * showed the irritation leading to disease, or rather to the disposition to disease which is exerted by the water-absorbing power of an air which is too dry and hot. As far as I know this valuable book has been but little observed, at least no practical results have sprung from it. In fact, I myself have known of it only the last few months, although independently of Krieger, and along other lines, I have made investigations on the deficiency of moisture in our dwellings and have drawn attention to gross mistakes in this matter for fully ten years. If through this renewed appeal I succeed in seeing any practical improvements introduced I shall feel myself richly rewarded. Perhaps in no other country in the world can one make as many investigations along this line as in the United States, especially in New York City, where in winter the houses are heated by means of hot air or its equivalent. I must refer you to my former work, but today I wish to repeat that with our system of centralized heating the air is generally heated in the cellar and at the same time robbed of most, if not all, of its moisture. In this condition it is transmitted to our rooms, where it proceeds to absorb all the humidity there present. The result is that we inhale air whose humidity is abnormally reduced. I have already given many examples and proofs of this and shown that the air in our dwellings *often* contains less than 20 per cent. humidity. In the last few years I have made many investigations (in a theatre on one occasion, at the end of the performance, there was registered only 12 per cent. relative humidity), of which I will mention only those made at Bedford Sanatorium. This sanatorium, situated in a suburb of New York, a few hundred feet above the village of the same name, meets with all the requirements of modern hygiene. It has large, high-ceilinged wards with numerous and large window, excellent ventilation, etc.—but central heating. Even here the percentage of humidity in the air remains, for the most part, far below normal, as you will see from the tables here appended. (The temperature of the outside air was tested in these experiments only once a day.)

*Aetiologische Studien (Ueber die Disposition zur Katarrh, Croup und der Diphtheritis der Luftwege). Strassburg i-E.

January.	Outdoor Temperat.	Indoor Temperat.	Relative Humidity.	Indoor Temperat.	Relative Humidity.	Hour.
		Ward No. 1.		Ward No. 2.		
4	41° F	62° F 54 60	38 per cent 42 37	52° F 46 55	45 per cent 38 41	8 A. M. 1 P. M. 8 P. M.
5	41° F	62° F 60 70	41 per cent 35 28	48° F 52 59	40 per cent 38 35	8 A. M. 1 P. M. 8 P. M.
6	35° F	66° F 69 65	36 per cent 35 32	57° F 52 60	50 per cent 48 30	8 A. M. 1 P. M. 8 P. M.
8	36° F	68° F 67 66	38 per cent 22 26	56° F 55 56	47 per cent 20 22	8 A. M. 1 P. M. 8 P. M.
9	21° F	60° F 62 65	22 per cent 23 26	43° F 55 56	24 per cent 21 20	8 A. M. 1 P. M. 8 P. M.
10	24° F	67° F 66 68	21 per cent 22 25	46° F 56 55	22 per cent 20 20	8 A. M. 1 P. M. 8 P. M.
11	40° F	68° F 65 72	22 per cent 25 34	45° F 43 62	35 per cent 34 41	8 A. M. 1 P. M. 8 P. M.
12	42° F	68° F 60 62	22 per cent 24 23	47° F 43 54	25 per cent 28 25	8 A. M. 1 P. M. 8 P. M.
13	20° F	58° F 63 64	24 per cent 25 25	51° F 62 48	23 per cent 21 22	8 A. M. 1 P. M. 8 P. M.
14	23° F	64° F 65 68	25 per cent 24 24	48° F 56 60	22 per cent 23 20	8 A. M. 1 P. M. 8 P. M.
15	35° F	66° F 67 64	26 per cent 26 29	50° F 52 58	25 per cent 28 31	8 A. M. 1 P. M. 8 P. M.
16	40° F	66° F 72	30 per cent 28	53° F 62	35 per cent 30	8 A. M. 8 P. M.
17	35° F	57° F 64	38 per cent 35	53° F 58	34 per cent 41	8 A. M. 8 P. M.
18	25° F	55° F 65	28 per cent 22	48° F 59	26 per cent 24	8 A. M. 8 P. M.
19	20° F	62° F 63	22 per cent 23	35° F 58	26 per cent 41	8 A. M. 8 P. M.

20	34° F	62° F 66	25 per cent 30	38° F 50	25 per cent 24	8 A. M. 8 P. M.
21	34° F	62° F 60 75	64 per cent 59 30	57° F 55 58	70 per cent 66 29	8 A. M. 1 P. M. 8 P. M.
22	47° F	58° F 55	38 per cent 39	50° F 57	43 per cent 33	8 A. M. 8 P. M.

Since a short time we have had, in the above mentioned sanatorium, a tent in which, by the way, the patient felt unusually comfortable even during severe weather. Now I had measurements taken at the same time in this tent and in one of the wards of the main building. The results were so striking that I cannot withhold them from you.

February.	Hour.	Temperature.		Relative Humidity.	
		Ward.	Tent.	Ward.	Tent.
1st	4 P. M.	60° F.	36° F.	40 per cent.	96 per cent.
2nd	8 A. M.	66° F.	35° F.	38 per cent.	93 per cent.
2nd	12 M.	66° F.	35° F.	39 per cent.	92 per cent.
2nd	4 P. M.	68° F.	40° F.	39 per cent.	90 per cent.
3rd	8 A. M.	68° F.	36° F.	32 per cent.	75 per cent.
3rd	12 M.	68° F.	50° F.	32 per cent.	45 per cens.
3rd	4 P. M.	67° F.	47° F.	32 per cent.	46 per cent.
4th	8 A. M.	65° F.	38°	37 per cent.	95 per cent.
4th	12 M.	66° F.	40° F.	43 per cent.	95 per cent.
4th	4 P. M.	66° F.	40° F.	40 per cent.	95 per cent.
5th	8 A. M.	66° F.	28° F.	35 per cent.	53 per cent.
5th	12 M.	57° F.	30° F.	31 per cent.	43 per cent.
5th	4 P. M.	58° F.	30° F.	32 per cent.	45 per cent.
6th	8 A. M.	64° F.	30° F.	29 per cent.	59 per cent.

6th	12 M.	57° F.	30° F.	30 per cent.	40 per cent.
6th	4 P. M.	63° F.	35° F.	29 per cent.	44 per cent.
7th	8 A. M.	70° F.	30° F.	35 per cent.	60 per cent.
7th	12 M.	66° F.	34° F.	25 per cent.	45 per cent.
7th	4 P. M.	64° F.	36° F.	23 per cent.	39 per cent.
8th	8 A. M.	66° F.	30° F.	36 per cent.	70 per cent.
8th	12 M.	64° F.	35° F.	40 per cent.	96 per cent.

Further measurements, which I will not detail, have also shown a marked difference in the moisture of the wards and in the tent. It amounted on the average to about 30 per cent. This difference was greater on rainy or very cold days, when the windows had to be kept closed most of the time, and less on clear, warm days. When, owing to the prevailing scarcity of coal, they were obliged, for a time, to do without heating, the difference in the quantity of moisture in the wards and tent was reduced to a minimum.

These are the conditions in an absolutely hygienically equipped sanatorium. But how much worse it is in our dwellings and especially in the sweat-shops and homes of the poor! Now it is obvious to every one that if we inhale an atmosphere which contains only 30 or 20 per cent. relative humidity, or still less, instead of 60 or 70 per cent., this same air will very soon absorb the moisture from our own respiratory organs. The upper air passages will show the effect first—namely, that the surfaces of the mucous membrane will dessicate quickly. A considerable amount of water is taken from the latter; in the beginning this is furnished in the secretion of the mucous glands and then from the cells themselves. "That the delicate cells of the mucous membrane, lining the respiratory organs, should remain insensible to the moisture-absorbing property of the air is the less easily believed from the fact that the more resistant cells of the epidermis are capable of absorbing water as well as of giving it off. Microscopic observation teaches us how quickly cells

with ameboid motion can be killed through dessication." (Krieger) That is what happens in the nose and throat. The secretion dries up, the ameboid action of the epithelia ceases and the solid masses ordinarily removed by them stagnate.

We have consequently a dry rhinitis with or without scab formation, such as I could produce experimentally in any one of you under given conditions. But such conditions are often found in winter without atrophy necessarily resulting; in summer such mucous membrane may go back to the normal condition. In cases subjected to frequent, prolonged and powerful influences of too warm dry air, the affected parts will not recover but will fall gradually into atrophy.

Most authors, and recently Cholewa, conceive this process very differently. The latter, for instance, believes that the glands of the mucous membrane would produce another than normal secretion if they, as is here the case, were surrounded by a half stagnated and consequently richly venous, blood current. It is similar with the lymph system. The escape of the fluid through the lymph ducts is very much hindered if not entirely stopped by the formation of flat epithelium.

This is all true, but what causes the formation of flat epithelium? It is the lack of fluid in the respiratory air. Through this the superficial layers of the mucous membrane dry up and formation of flat epithelium follows. This once present, the glandular secretions stagnate still more and the production of the over-charged cell corpuscles, the twisted excretory ducts and the greatly enlarged funnels opening into the surface of the mucous membrane are all simply secondary phenomena caused by the stagnating secretion.

M. Schmidt ascribes the cause of scab formation to a dry and dusty air. He believes that that is induced more often by the addition of an unknown element, which he compares to the "siccative" which painters mix with their colors and which is most prevalent in the dusty air of a dry spring. I showed years ago that dust plays a most unimportant role, or perhaps none at all, in this matter. But to me, who have studied the local condition in New York, it is incomprehensible why we have to search for a special "siccative." The dried up air of our dwellings is such a frightful "siccative"

that it is quite unnecessary to look around for any other. This "siccative" once established, we will be able to explain many phenomena whose explanation otherwise would cause us much difficulty.

Years ago I believe I showed how a post-nasal catarrh originates * under the above conditions. I believe still that the naso-pharynx is always primarily affected, among other reasons because it is here that the air current experiences a whirl movement and absorbs more moisture from the mucous membrane than in other parts of the upper air tract.

If the naso-pharynx is once affected then the nose will also become affected, or, in case of mouth breathing, the pharynx. In the first case we have a rhinitis sicca, and in the latter a pharyngitis sicca, both of which finally lead to atrophy. That all parts of the nasal interior are not affected in the same way and at the same time is evident enough. Therefore it is not clear to me why Siebenmann and Ribary believe that they have discovered a new disease, the rhinitis sicca anterior. Ribary† finds furthermore that the ciliated epithelium of the cartilaginous septum is changed into flat epithelium and argues, since this occurs also in rhinitis sicca anterior, that this should be classified under rhinitis atrophica restricted to the septum, and this all the more because here also atrophy appears in the progress of the disease. For this last reason alone I am unable to classify rhinitis sicca anterior as a separate disease. It is if anything, the incipient or one of the incipient stages of general atrophic rhinitis.

Now, the cartilaginous septum is the very place most prone to hemorrhages. Many authors account for this "by the unusual thinness of the mucous-membrane-coating in those parts, by its tight adhesion to the cartilage, which should prevent the contraction of the vessels if they are once even superficially eroded;" furthermore, abundance of the blood vessels of the septum, etc. However all this does not happen; because the mucous membrane of the septum is not richer in blood than the covering of the turbinals and

* W. Freudenthal—Some points regarding the Etiology of Post-Nasal Catarrh. *Journal of the Am. Med. Assn.*, Nov. 9, 1895.

†Klinisch-anatomische Beiträge zur Rhinitis sicca anterior. *Archiv. fuer Laryngologie*, Bd. IV., pag. 301.

not thinner than the mucous membrane of the rest of the nose; also not more tense. The cause of bleeding seems to Ribary that the anterior part is much more exposed to injury, especially when scab formation is present.

He says furthermore, "Siebenmann was the first to define the dry catarrh (to which he gave the name rhinitis sicca anterior) as the principal cause of the benign perforating ulcer of the septum."

This last opinion I hold as the most important. It is the dry catarrh, call it as you will, anterior or posterior, that makes the mucous membrane fragile; and a slightly vigorous blowing of the nose is sometimes sufficient to cause bleeding. In cases of atrophic rhinitis during the winter, bleeding from the anterior parts of the septum is extraordinarily frequent, and the reason that just these parts bleed is that the cartilaginous septum is movable, and even slight movement of the same toward the right or left in nose-blowing causes a tear in the fragile mucous membrane and bleeding. If besides, in the intervals, the patient bores in the nose with the finger, we finally get an *ulcus septi nasi perforans*, such as I described twelve years ago.*

Cholewa and Cordes, whose most valuable contributions to the *ozena* question are familiar to you all, claim that the bones are first attacked by atrophy—a theory which would seem, after their thorough investigation, to have much in its favor. According to my idea, however, I must retain the belief that the physical influences work from without inward, and therefore that the mucous membrane is affected first and the bones only later. I think, though, that the mucous membrane is often at least partly regenerated, under changed atmospheric conditions, while with the bones this is not the case. I reached this conclusion after finding frequently that noses which in winter present clinically a typical picture of atrophy, looked entirely different in summer or even in winter, after proper treatment. It seemed as if the *corpora cavernosa* had suddenly appeared there again. Naturally where a fully developed atrophy has been present, no recuperation is possible, but these cases are comparatively rare.

*W. Freudenthal—"Ueber das *Ulcus septi nasi perforans*." *New Yorker Medizinische Monatsschrift*, May, 1891.

Let us pause a minute and ask: "Are the organs of respiration the only ones in the human system that suffer from the water-absorbing property of the air, or has it an influence in other directions?" A short consideration will bring to mind a number of new facts which I wish to introduce here, principally to furnish further proof of my views.

In what manner does the artificial climate which prevails in our houses, especially its dryness, influence our system? Let me begin at the top and mention here in the first place

EARLY LOSS OF HAIR, COMMON BALDNESS.

In this connection I shall not refer to such diseases of the hair as occur in connection with favus, herpes tonsurans or those caused by acne, variola, lichen ruber, etc. I shall likewise omit the discussion of baldness so frequently met with in the course of general diseases such as typhoid, scarlatina, syphilis, puerperal fever, etc. In my theme the subject in which I would enlist your interest is the idiopathic early effluvium pilorum, in which a distinct disease of the hair cannot be found.

What are the causes of this so frequent abnormality? Many authors in discussing the diseases of the hair omit entirely the etiology, while others bring forth a mass of theories which have little to commend them to consideration. Allow me to direct your attention for a moment to an article by Seeger* of Vienna. He believes that the head covering of men, in whom baldness is so frequent, is much more unhygienic than that of women, in whom it is much rarer. The first is heavy, stiff and tightly fitting, permitting very little or no air and light to pass through. In addition to this, whenever the wearer of such a hat perspires, the sweat being prevented from evaporating collects on the scalp and of itself gives rise to nutritive disturbances. All these factors finally lead to atrophy.

Although these ideas are based upon very accurate observations, the conclusions drawn from them do not seem equally established. If this stiff covering for the head really produces atrophy by pressure, then this atrophy should be noticed

* Ludwig Seeger—"Studie ueber vorzeitige Kahlheit," Wiener Klinik, Dec., 1892.

first at those places upon which the pressure is exercised. This would be in a line commencing a little over the temples and extending around the head (posteriorly below the occipital protuberance) to finally return to the front. Now this is by no means in accord with our experience, since in reality the loss of the hair commences at a place almost invariably situated within the crown of the hat and never is exposed to its pressure. You surely have never seen a baldness that has commenced where the hat pressed on the head. No, indeed, the causes have to be sought in another direction, and I do not believe we go wrong if we regard the dryness of our artificial climate as the real cause.

The covering of hair has been given to us by nature for two reasons: first, it acts as a poor conductor of heat, thus protecting head and neck against too intense cold as well as the too strong rays of the sun; second, on account of its hygroscopic properties. For this latter reason hair is just as necessary for the human economy as the preservation of forests for nature's greater household. Forests bring about the equilibrium of heat and humidity in nature, supply rivers and brooks with water and afford protection against the burning heat of the sun. The rooting out of forests that has been and is still going on in some parts of the country in an outrageous manner, has already been followed in these sections by deterioration of the climate, lack of water, etc.

In its relation to the human being the hair serves the same purpose as the forests. We know that the hair possesses to a marked degree the quality of attracting moisture energetically from the atmosphere and of giving it off readily. Upon this quality is based, as you know, the principle of the hair hygrometer. Now this property is being systematically suppressed by us and even destroyed. The hair is cut short from early youth and arranged in conventional form, in which it is kept by means of pomade, oil, etc. When the boy grows, very soon school work commences and he has to sit for hours in the evening directly under the rays of the gas or electric light, which has the effect of drying out everything, and naturally that nearest to it first of all. This fact I consider most important in the etiology of the early loss of hair. The heat that is thus thrown on our heads is sometimes enor-

mous. In this way the hair gives off every particle of humidity and may do so for years without detriment. Then, however, under this continued occupation under the direct rays of gas or electric light—and most brain workers like to study best at night time—what will follow? Just as in other parts of the body, here too an atrophy will set in and the follicles, papillae of the hair and the peripheral nerve ramifications are destroyed. The process that goes on here is, I believe, exactly identical with that observed on the mucous membranes. In order to compensate for the marked lack of humidity, the secretion of the sebaceous glands of the scalp is abnormally stimulated and in reality the resulting seborrhea, i. e., the excessive production of the sebaceous secretion, is nothing else but the first step of baldness.* Not until later, after this seborrhea has persisted for a long time, do the dried masses of sebaceous matter and epidermic scales become detached, the transformation of the cells of the so-called hair pulp into hair substance decreases, the hair of the crown begins to fall out and (sometimes) persistent baldness sets in.†

Now, it is not necessary for any one to be a brain worker in order to become bald headed. Every vocation in life that forces a man for a very long time to the artificially illuminated desk or working table, will produce the same result. It is true that formerly only the student and writer had the privilege of working in this unhygienic manner and drying out slowly. Now-a-days, however, especially in large cities, many thousands have to work under artificial light, even in day time. You surely know as well as I do the many book-keepers, for examp'e, who almost through the entire winter have to work all day under gas or electric light. Look at these people and you will be surprised to see how often you find this affection among them.

Women who are exposed to the same work will finally suffer the same consequences. But these will not be nearly so bad as in men for two reasons: First, the loosely worn hair of

* See Max Joseph's article on Alopecia in "Lesser's Encyklopaedie der Haut und Geschlechtskrankheiten." Leipzig, 1900.

† Isidor Neumann—"Lehrbuch der Hautkrankheiten." 5 Auflage, p. 428. Vienna, 1880.

women contains much more humidity and will thus resist the drying process of the gaslight much longer, and, second, outdoors it can take up much more humidity from the air, since it is not plastered together. In men this is not possible, for the very places exposed to the artificial light are those constricted by the tightly fitting hat. These places are by far the most commonly affected, while those not enveloped in the head covering, especially the neck and beard, generally continue to grow luxuriantly.

What are these white dandruff-like masses that come off so early in combing the hair; what else are these dry sebaceous masses and epidemic scales, but formations analogous to the dried crusts and scabs of the nasal and pharyngeal mucosa? The process is here as elsewhere exactly identical—that is, in the early stages there is a state of hypersecretion, then of dryness and finally atrophy.

CERUMEN.

Let us go a step further and we meet with a less striking and important condition that etiologically belongs to the same category, viz: cerumen.

This anomaly also appears in the text books under the chapter "hypersecretion." In discussing it we shall, as before, pay no attention to anomalies of the external canal of the ear, to improper cleansing of the latter, etc., but shall speak only of the *idiopathic* accumulations of ear wax, if I may use this term.

The cerumen or the combined product of both the ceruminous and sebaceous glands, is secreted continuously under normal conditions, in some cases more abundantly than in others. This tenacious, rather smeary fluid does not stagnate normally, but is removed, according to Buck* by the action of the outer layer of the epidermis lining the meatus. This epithelium has the property of moving from within outward, thus carrying the cerumen with it out of the meatus. The cerumen becomes inspissated in the meatus only when the fluid contents evaporate quickly. Then a more consistent mass remains that can be no longer removed by the action of the epithelium. Once a nucleus is present, more solid

*Manual of Diseases of the Ear. New York.

masses gather round it and soon the impacted cerumen is there.

To treat this process under the heading of hypersecretion is, as I have said before, not correct. Under the conditions mentioned at the beginning of this paper, the fluid contents of the material secreted by the glands of the meatus externus evaporate quickly. The dryness of our rooms not only affects the nose, throat and hair, but in exactly the same manner the ear. In the beginning of this process nature here too will provide for the increased demands for humidity, and the glands consequently will be stimulated to increased activity. At first we get a hyperemia and hypersecretion, that, however, is only transitory. Slowly, however, nature's auxiliary forces become exhausted, and the overstrained glandular apparatus has reached the end of its function. The glands shrivel and become atrophic and we have the same process as observed in the pharynx, nose, etc.

That the hypersecretion alone could not be held responsible for the production of impissated cerumen, was already known to Buck. He, too, noticed very often the presence of cerumen associated with nasal and pharyngeal catarrh, but explains the former as a reflex phenomenon, a view in which we cannot coincide. Buck as well as Pomeroy and a few others have recognized that there is some connection between cerumen and affections of the nose and throat, but how this occurred, the *modus operandi* was unknown to them. I hope I may be able to convince you that both are natural consequences of one and the same cause.

That occasionally you find impacted cerumen that is not hard and dry, but rather soft and saturated with fluid, speaks just as little against my theory as the often noticed fact that many people feel the presence of ear wax more in summer. In the former case water got into the ear during washing of the face, in the second through swimming. In swimming generally a good deal of water enters the ear and the wax becomes soaked, a fact which perhaps you may have noticed on yourselves.

Frequently, however, you see whitish-yellow scales formed in the meatus, and these are nothing but dried epidermic cells. For several years I watched in my private practice

the occurrence of these masses and found them more frequent in winter than in summer, and quite often in patients with post-nasal and similar "catarrhs." Just during this season the atmospheric conditions favor such desiccation. The complaints in summer, as far as I recollect, even in susceptible patients, were decidedly less frequent. Even if they did not take sea baths, the difference between the influence of summer and winter upon their condition was very marked.

One more point is of importance here. It is the general consensus of opinion that the accumulation of cerumen is principally an affection of men. According to Buerkner* there were about 818 cases of impacted cerumen at his clinic in Goettingen, 630, or 77 per cent. in men and 188, or 23 per cent. in women. Is this marked difference between the two sexes not astonishing? Are we not directly forced to think of the protection their hair confers upon the females? Who, on the other hand, does not think here of the similarity of causes that exists between the destruction of forests and the loss of hair in its pernicious effects?

During the month of March, 1902, I examined the inmates of the Bedford Sanitarium for Consumptives. There were present 67 male and 41 female patients, or a total of 108. Only a few of them really complained of their ears, but they were all examined. I found inspissated cerumen in one or both ears in 28 male and 12 female patients. In other words, out of 108 patients 40 had cerumen, or two out of every five.

Early in November, 1902, I repeated these examinations on all inmates who were able to come downstairs to the clinic, nearly all of them being new arrivals and not figured in the former statistics. There were present 122 patients (84 male and 38 female). Inspissated cerumen was found in 32 cases (27 male and 5 female), or in almost every fourth patient. We see from these figures that the number of patients suffering from this affection was much larger in March i. e., at the end of winter (40 out of 108) than in November, at a time when the cold weather had hardly set in (32 out of 122). Should we not consider this result as the natural effect of the artificially heated winter air in our rooms? I must remark here that in March, 1902, the sanatorium having

*"Lehrbuch der Ohrenheilkunde." Stuttgart, 1892, p. 89.

only been opened a short time, the inmates had not received the beneficial effect of fresh country air sufficiently.

XERASIA.

There remains no doubt in my mind that all these phenomena are to be ascribed to one cause, which I wish to include under the common name xerasia. I chose this name according to the suggestion of Dr. A. Rose, an excellent Greek scholar. I do not use the word xerosis as it is employed in ophthalmology, because this term means something else (xerosis conjunctivae and corneae). Whether this disease, xerasia, as well as the one known as xeroderma simplex, do not belong to the group of xerasiae is a question I do not wish to decide now. Further investigation in this field would surely be of great interest.

There remains the discussion of a question which has not yet been answered, namely, whence comes this increased secretion? How can one reconcile an atrophic mucous membrane with this plentiful secretion, as the followers of the accessory sinus theory say? It is an impossibility to assume that a mucous membrane, whose organs of secretion are almost destroyed, will secrete more than normally. He, undoubtedly, is a great objection to the theory of primary nasal involvement, yet the contradiction is only apparent. In reality these mucous membranes do not secrete more than normally, but the accessory conditions have changed. The secretion discharges itself just as usual into the mucous membrane, but the receptacles for it—the glands, etc.—have in a great measure disappeared—so where can it go? It can not evaporate from the surface, since there is a dry mass (crusts, etc.) there, which prevents this. It remains therefore in the same place, and under such favorable conditions decomposes with the greatest ease. We have an analogy in the retro-nasal catarrh. Here, also, we have an apparently increased secretion, which in reality signifies just the opposite condition:

One could mention another example—baldheadedness. Take a man with a pronounced bald head. When for any reason such a man becomes overheated, you will notice that the beads of perspiration form on the spots where there is

least hair. He perspires in such places first, and much more visibly than in the parts covered with hair, and yet the hair follicles and papillae are lacking there. So also in this atrophic condition, there is a seemingly increased secretion. The reasons are the same as above: The metabolism is the same in the covered as in the bald spots and the secretion discharges itself *caeteris paribus* everywhere equally; on the normal skin and mucous membrane it is retained, but over the destroyed parts it flows freely.

I wish to recall here the numerous productions of scabs and crusts in luetic affections of the nose. There are cases where the luetic destruction has gone so far that we can see into the entire maxillary sinus, etc., and still there is considerable secretion. Surely in these cases we cannot speak of a sinus suppuration. It is perhaps only a further confirmation of the fact that where the secretive power of the mucous membrane is entirely or partly destroyed, scabs and crusts must form.

Now, as a general thing, the secretion as well as the general metabolism is greater in young people than in old. This perhaps explains the fact that in elderly people, often already in their 45th year, the secretion from the nose ceases, and with it the symptoms of ozena disappear. If we are convinced that there is no hyper-secretion then it is absolutely unnecessary to take for granted, as many do, that the ozena-affected mucous membrane gives forth a secretion which is not entirely complete, "one which lacks that chemical substance which gives to the normal secretion its bactericidal property." The secretion discharges itself as usual, evaporates however so quickly that the solid elements cannot be removed, but adhere to the mucous membrane. New quantities of fluid are discharged, which however, under the pressure of the solid masses, must stagnate. Now this stagnating secretion is decomposed and smells—and we have a fetor from the nose and from the retro-pharynx, just as we might have from the stomach, the uterus or from any part where pus decomposes.

But to create the special odor of ozena, one more thing is essential, and that is Abel's bacillus. Although I wish to maintain the above-mentioned consideration, the fact cannot

be denied that in the many cases of ozena I have examined, I have invariably found the *bacillus capsulatus*, while it is equally important to note that in accessory sinus disease I have *not always* found it. The bacilli were so plentiful in some cases of ozena that one could imagine it was present in pure culture instead of a secretion taken directly from the nose. Dr. H. Schwarz, of New York, who made several examinations for me, confirmed this.

But since Abel's bacillus is found in normal noses and even in hypertrophic conditions, without there being a trace of odor noticeable, we are forced to the conclusion that there must be a preliminary condition leading to the accomplishment of the ozena-picture—namely, atrophy of the nasal interior.

How is it that ozena is most often found in women? It seemed to me that I could answer this question after noticing the following:

A three-year old girl was brought to the hospital with an acute infectious disease. After two weeks she developed an acute otitis media purulenta, and I saw her then. Two or three weeks later the house physician told me that since a few days the child had had a discharge from the vagina. This discharge was examined and found to be identical with secretions from the ear. After repeated and thorough examinations, gonococci were not found. It was evident that the child herself had transmitted the infection from the ear to the vulva. This case gave me subject for thought, because, said I, if such a transmission is possible, cannot the opposite be true; i. e., that the infection might be carried from the vulva upward, especially to the nose, by means of the fingers? Peculiarly enough, I found two patients soon after, a girl of 14 and a woman of 30, who had the *bacillus capsulatus* in the vulvar secretion, which spoke strongly in favor of my assumption. Since then I have seen ten other cases, but (unfortunately ?) Abel's bacillus could not be found in the vaginal secretions. We must therefore await further investigation in this line.

We are not in a position to-day to state how these bacilli lodge themselves in the nose and aid in producing the picture of ozena. We will, however, not forget that one must not

immediately diagnose ozena whenever Abel's bacillus is found, any more than we would diagnosticate tuberculosis if we found a few tubercle bacilli in the nose, or diphtheria every time Loeffler's bacillus was found in the pharynx.

Finally, I must confess that in the last few years I have seen a few cases, which formerly I should have diagnosed as ozena without the least hesitation; repeated and thorough examination showed a sinus suppuration. I do not hesitate right here to express my gratitude to the gentlemen who have so energetically defended the accessory sinus theory. Unfortunately, such findings were exceptional in my cases.

FINAL CONCLUSIONS.

1. Ozena is an atrophy of the nasal interior, which is conditioned by atmospheric influences—Xerasia.

2. The bones of the turbinated bodies appear to be affected at an early period of the disease.

3. The effects of lack of humidity in the air are apparent in all parts.

- (a) Of the nasal interior, including diseases which were formerly looked upon from a different point of view, as for example, *ulcus septi nasi perforans*, the *rhinitis atrophica anterior*, some forms of *epistaxis*, etc.;

- (b) Neighboring parts of the body (scalp, ears, lips, teeth);

- (c) Probably also in distant organs.

4. In order to convert this atrophy into ozena, the plentiful invasion of a bacillus, similar to Friedlaender's pneumobacilli, is necessary.

5. This invasion occurs in an early period of life and is caused, perhaps in some cases, by direct transmission from the vulva.

6. Accessory sinus disease often appears as secondary to ozena.

7. After all has been said, ozena is to be considered as a genuine and autochthonous disease, resulting from atrophy of the nasal interior.

XIX.

AN UNUSUAL CASE OF FRONTAL SINUSITIS. ABSENCE OF THE SEPTUM.*

BY C. G. COAKLEY, M. D.,

NEW YORK.

At the present time, when the diagnosis and treatment of diseases of the accessory sinuses are occupying a prominent place in the daily work of all rhinologists, it seems fit to record a case which departs from the typical anatomical appearances. We take pleasure in presenting the following case:

PREVIOUS HISTORY.

Mrs. A. B., aet 62, weight 97 lbs., U. S. Had always enjoyed good health with the exception of slight attacks of malaria and an attack of grippe in 1898. Had never had any nasal obstruction or hypersecretion. About July, 1899, she suffered considerably from frontal headache, which ceased in a few weeks. In January, 1900, there was noticed a bulging above and to the inner side of the right eye, which was accompanied by some throbbing pain. At the end of a week the mass was the size of a filbert and the eyeball was displaced downward and outward. Vision was not interfered with—no diplopia. It opened spontaneously on Jan. 28, 1900, about half an inch above and to the inner side of the inner canthus. The discharge consisted of thick yellow pus, having a slightly offensive odor. There was no discharge from either naris, nor any from the posterior nares. She consulted a well-known eye specialist in a city near her home, who probed the fistulous tract, but did not at that

*Presented to Ninth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Lexington, Ky., April 30, May 2, 1903.

time wash out the cavity. The purulent discharge not having abated, she came to New York in October, 1900, and consulted the late Dr. Noyes. A physician who was present at the consultation told me later that Dr. Noyes passed a probe through the the fistula outward to the left to a point beyond the middle of the left orbit. Mrs. B. was advised to return home and put herself in the hands of her oculist for a radical operation on the frontal sinus.

The latter part of October, 1900, the fistulous opening was enlarged under ether, a portion of the anterior and inferior bony wall of the right frontal sinus was removed and the cavity curetted. There was no drainage inserted through the naso-frontal duct. The cavity of the sinus was packed with gauze, which was renewed daily for five or six months. There was no nasal discharge during this period. Packing was then discontinued and simple washing of the sinus resorted to. Fluid injected through the external wound passed very readily through the right naso-frontal duct and appeared at the right nostril. None came out of the left nostril. This irrigation treatment was continued daily for about a year until she was referred to me by Dr. J. P. Munn, of this city, January 18, 1903.

EXAMINATION.

I found a small fistula above the inner canthus of the right eye, at about the junction of the horizontal and vertical portions of the frontal bone. The right middle turbinal was much swollen and reddened, touching both the outer wall and the septum. A probe passed between the outer wall and the middle turbinate encountered a soft pulpy mass, which bled freely. With the middle turbinate intact, it was impossible to tell what this mass was or to pass a catheter into the frontal sinus. The mucous membrane of the left nasal cavity was normal. The left middle turbinate stood well away from the outer wall, and no secretion was visible. Transillumination of the antra gave perfect illumination on each side, and the patient's sensation of light in each eye was abundant and equal. On transilluminating the right frontal sinus there was practically no illumination, and a similar procedure for the left frontal sinus showed the same as on

the right. Under cocaine, I removed the hypertrophied anterior end of the right middle turbinate. The soft mass was seen to be granulation tissue springing from the region of the bulla and anterior ethmoidal cells. The diseased tissue was removed by forceps and curette, the underlying ethmoidal cells were found filled with pus and polypoid degeneration of their lining mucosa. The diseased cells were all cleaned out intra-nasally at two sittings prior to operating upon the frontal sinus. A catheter was now passed through the right naso-frontal duct into the frontal sinus. The diagnosis made was chronic empyema of the right frontal sinus with probable involvement of the left. The patient was advised to have the left sinus explored first on the ground that if it were not diseased it could be closed and danger of infection thus averted. To this she consented.

OPERATION.

On January 24, 1903, under chloroform anesthesia an incision was made along the middle of the left eyebrow, which had previously been shaved. With chisel and mallet a few strokes entered the frontal sinus and thick yellow pus exuded from the opening. The opening was enlarged to about half an inch in diameter. A probe showed the cavity to extend outward to the left to nearly the external margin of the orbit, while toward the median line the probe passed without any resistance to the right of the middle of the right orbit. The cavity was filled with polypoid degeneration of the mucous membrane. This opening was enlarged externally until all parts of the cavity could be curetted and explored by direct illumination. A similar opening was made through the anterior wall of the right frontal sinus. A bridge of bone in the center of the forehead, one inch wide, separated the two openings. No trace of a septum, not even a ridge, could be found indicating the position of a septum between the two sinuses. A posterior offshoot in the median line formed a cavity, like a third sinus, fully 3-4 of an inch deep antero-posteriorly and half an inch wide. Every trace of mucous membrane was removed from the sinus cavity and the naso-frontal ducts. The duct apparently was as well marked on the left as on the right. There was no trouble in passing a

probe through each duct into the nose, at least I was not aware of any obstruction or using force in entering the left nasal cavity. What to do with the median posterior offshoot gave me no little concern. The safest procedure for rapid healing would have been to cut across the lower and upper parts of the bridge of bone and allow the piece, with its periosteum attached, to fall back into the sinus, thus filling the gap in great part. Hajek* recommends this method highly. The anterior bony wall of the sinus was so thin I feared the deformity would be very great, so contented myself with packing the entire cavity with two strips of 5 per cent. iodoform gauze, packing half through one opening and half through the other. We began by packing the naso-frontal duct first. The operation lasted $1\frac{1}{4}$ hours.

The patient, in spite of her age and frail appearance, stood the operation well. Her highest temperature was 99.6° by rectum. The gauze packing was not removed for *two weeks*. There was no discharge and no temperature, therefore no necessity for removing the packing earlier. The sinus could be seen completely lined by granulation tissue. Probe detected no bare bone. At that time I irrigated the cavity with normal saline solution to determine whether the naso-frontal duct was occluded. It was found to be so, no fluid passing into the nares. The cavity was wiped dry and repacked. Subsequent packings without irrigation were at intervals of six to eight days. Mrs. B. left the hospital at the end of the third week and went out driving and walking. About the middle of March she had an attack of grip and malaria, her temperature going to 104° . This apparently did not interfere with healing or increase the discharge. A remarkable feature of the case is that the amount of discharge all told has not been three drams. At the present time, April 24th, the left cavity is filled up completely and the left opening closed for two weeks; likewise the median cavity all but a small tract about $\frac{1}{8}$ of an inch in diameter and $\frac{1}{3}$ of an inch long. This will probably be closed in two or three weeks at the present rate of healing. There has been no nasal or post-nasal secretion during the healing.

*Pathologie und Therapie der entzündlichen Erkrankungen der Nebenhöhlen der Nase, 2nd Edit., p. 189-190.

REMARKS.

The interesting features of this case are the absence of the septum, the large size of the sinus, and that healing took place in it without the necessity for resection and an osteoplastic operation.

It occurs to me that there are but three explanations for the absence of the septum in this frontal sinus.

I. It was destroyed as a result of the long-standing supuration.

II. It is an example of congenital absence of the septum.

III. We have to do with a single sinus developing from the right naso-frontal prolongation from the nose and spreading out over the left frontal region.

Concerning the septum between the frontal sinuses the following observations are interesting and instructive.

Turner* says: "I have never found it incomplete in the normal skull, although this does not agree with all observers."

Tilley† says: "Specimen 20 is the only case of all examined in which on opening the sinuses the septum was found incomplete, but from the shape of the aperture I am inclined to think it was a traumatic opening."

Lothrop:‡ "With remarkable constancy, on account of its often delicate structure, this septum is usually complete, so that there is no communication between the sinuses. An examination of 180 specimens has revealed two examples, one an oval perforation near the center of the septum, the other its almost entire absence." He gives a cut of this in Plate 55.

In a letter to Dr. Lothrop I inquired whether there were any evidences that this was a result of disease. He very kindly replied: "The specimen to which you refer was a developmental anomaly. The nasal fossae and sinuses showed no pathological processes. The specimen was an interesting one to me."

* A. Logan Turner—*The Accessory Sinuses of the Nose*, p. 20.

† Investigations of the Frontal Sinus in 120 Skulls. *Lancet*, 1896, p. 867.

‡ Howard A. Lothrop—*The Anatomy and Surgery of the Frontal Sinus and Anterior Ethmoidal Cells*, p. 13.

Hajek* says: "Defects in the septum of the frontal sinus are considered to have been observed, yet only on macerated bones. * * * The destruction of the septal wall in consequence of disease does not belong to this category."

Sieur et Jacob:† "Usually of extreme thinness, presenting gaps at times, the septum could not oppose, to an active suppuration of long standing, a serious barrier." And in a foot note they remark: "Personally we have never encountered a gap in the septum."

Hartmann‡ does not mention an absence of the septum except in the case of a frontal sinus developing from the right side alone and extending in the frontal bone over both the right and left supra-orbital regions. There was no communication of the sinus with the left nasal cavity.

Turner§ says: "In two instances I have seen a single sinus occupy the whole frontal area immediately above the root of the nose, and extending from one supra-orbital margin to the other. In one case the cavity was the right, and the other the left frontal sinus, and in each instance the sinus communicated by a single orifice with the nasal chamber of one side."

I. Under the first supposition, viz., the septum destroyed as a result of the disease process, we must not forget that there must have been considerable tension within the sinus to result in necrosis of the inferior wall at its thinnest part which resulted in a fistula. The same tension might easily have produced a similar necrosis in the septum and made a communication between the sinuses, but scarcely its total destruction. Before any operation Dr. Noyes had passed a probe beyond the median line to the left of the middle of the orbit. I found the sinus on operation still further to the left. Considering the small size of the opening made at the first operation, it is unlikely that the septum was all curetted away at that time so as to leave no trace, as I am informed that the mucous membrane was not completely denuded from the right cavity at that operation.

* Hajek, *loc. cit.*, p. 134.

† Sieur et Jacob—*Recherches anatomiques, cliniques et operatives sur les Fosses Nasales et Leurs Sinus*, p. 406.

‡ Hartmann, *Atlas der Anatomie der Stirnhöhle*, p. 19.

§ Turner, *loc. cit.*, p. 26.

Tilly* reports a most instructive case of double frontal sinusitis in which at the operation he found a perforation of the septum. Whether made by himself during the operation or as a result of the disease he could not say. He curetted both sinuses through a single opening to one side of the median line. The discharge lasting a long time, he decided to operate again, opening on both sides of the median line. He found the sinus in which the first opening was made in good condition, but the other badly diseased. He remarks that "it is impossible to thoroughly deal with both frontal sinuses through an opening, however large, in one of them." It seems to me that our case illustrated very well in the first operation this same point.

If the septum in Mrs. B. was completely destroyed as a result of disease, it is unique in so far as my researches have failed to find a record of a similar case.

II. If there never was a septum in our patient it is also worthy of record. The case that comes nearest to it is the one of Lothrop's above referred to.

III. It does not seem to me likely that our case was one of sinus developing from but one side of the nasal chamber, viz., the right. The presence of a well defined depression in the region where the left naso-frontal duct is usually situated and not having been conscious of passing through a bony wall at the bottom of this depression in entering the left nasal fossa make me feel that the hypertrophied membrane alone occluded this duct and prevented the escape of pus and irrigation fluid into the left naris.

*Tilly. *Journal of Laryngology, Rhinology and Otology*, Vol. 16, 1901.

XX.

ETIOLOGY, PATHOLOGY AND SYMPTOMATOLOGY OF CHRONIC SUPPURATIVE OTITIS.

BY CHARLES W. RICHARDSON, M. D.,

WASHINGTON, D. C.

The most frequent cause for the existence of a chronic middle ear suppuration is the transformation of an acute suppuration into one of chronicity; however, this chronicity may be induced. The various ways by which this chronicity may be induced are as follows:

1. By neglect of or an inappropriate treatment of the acute stage. This form of chronic suppuration usually responds readily to judiciously applied local treatment.

2. Through the existence of certain types of constitutional invasion that exert an unfavorable influence on local lesions. Such constitutional conditions are scrofula, tuberculosis, syphilis, anemia and marasmus.

3. Through the occurrence of acute suppurative otitis during the invasion of certain of the acute, infectious diseases, as scarlet fever, measles, diphtheria and typhoid fever.

4. The virulence of the infection and the character of the bacilli present.

5. The acute invasion of the attic is very prone to terminate in chronicity.

6. Through local changes excited at the time of the invasion, or those taking place during progress of the case, such as; (a) The developement of granulation tissue about the membrane or walls of the tympanic cavity; (b) Through periostitis or caries of ossicles or tympanic wall; (c) Through retention and inspiration of purulent discharge.

- (7) Thorough local changes within nasal and nasopharyngeal cavity.

All forms of chronic suppurative otitis are not secondary to the acute type, as we have a class which is essentially chronic from the moment of its invasion. In this class belong these chronic suppurative otitides due to tuberculosis, anemia and diabetes.

The pathologic changes in the condition under consideration are not limited to the confines of the tympanic cavity, but usually extend from the tube to the mastoid cells and from the labyrinth to the auditory canal, involving to a greater or less extent the between-lying structures. The epithelial structures are markedly altered. There is frequently epithelial denudation and necrosis. In those areas where the epithelium is denuded, we have the development of an active papillary granulation tissue, containing cysts. The mucous membrane is generally infiltrated, and consequently many times increased over its normal thickness. The infiltrate is made up of small round cells, with increase in the number and size of the blood vessels. As a result of the development of the papillary granulation tissue, we have the formation of distinct buds, which, if further projected, form polypi. These are seen projecting from the ossicles, tympanic walls and the periphery of the perforations in the membrane. In uncomplicated cases, the bone is not usually affected. Caries and necrosis of the ossicles are the most common forms of bone lesion in the disease under consideration. On account of its limited nutritive supply, the incus is the ossicle most frequently affected. The invasion of the incus may be in the form of caries of its long process or body, or that of necrosis of these parts, or complete necrosis of the whole bone. The malleus is almost as frequently involved, which may be in the form of caries of the malleus head or the tip of the long process or necrosis of one or both of these parts. The stapes is but rarely affected. As a result of caries affecting the ossicles at the articular surfaces, through the disintegration of the ligaments or the contraction of surrounding fibrous bands, we occasionally have dislocation of the ossicles, most frequently affecting the malleo-incudal joint. The carious process may extend to the walls of the tympanic cavity, especially affecting the tegmen tympani and the outer wall, and that portion of the external wall which is formed by the

auditory plate of the temporal. The inner wall is only rarely affected, such invasion usually occurring in tubercular cases and in those secondary to scarlet fever and diphtheria.

The membrane always presents the external evidences of the changes which have been wrought within the tympanic cavity. There is almost always destruction of the membrane to a greater or less extent. The remnant of the membrane varies according to the degree of the activity of the process. At times, the membrane is congested and infiltrated both in the cuticular and mucous layers; at other times it is opaque from degenerative changes, and showing here and there chalk deposits. Very frequently the cuticular layer extends over the edges of the perforation, thus rendering the perforation permanent. From the continued irritation of the purulent discharge passing through the auditory canal, we have a resulting dermatitis of the canal. The dermatitis produced in the canal is occasionally followed by an atresia of the auditory canal.

The mucous membrane of the eustachian tube is like that of the tympanic cavity, infiltrated. There is an increase in the size of the acinous glands. The epithelia are frequent y denuded.

The changes in the mastoid during chronic suppuration are the most important changes which take place in this serious lesion. These changes are:

1. Congestion, swelling and polypoid degeneration of the lining of the antrum and the mastoid cells.
2. Complete obliteration of the antrum and the mastoid cells through granulation-like development of the lining of the antrum and mastoid cells.
3. Osteo-sclerosis of the mastoid.
4. Accumulation of muco-purulent and purulent secretion in antrum and mastoid cells.
5. The formation of cholesteatoma in mastoid.
6. Circumscribed or excessive caries or necrosis of mastoid.

Symptoms.—Frequently the most pronounced and characteristic symptom of chronic suppuration of the middle ear is the presence of a discharge from the ear. The amount and character of this discharge varies not only in the same case at different times, but varies greatly in different cases. The

amount may be so great as to show an almost continuous discharge from the canal, requiring frequent cleansing or changes of cotton, to a fraction of a drop during the twenty-four hours. The discharge may be offensive from want of cleanliness, from caries or necrosis or from cholesteatoma. The discharge may be red, reddish brown, dirty green, or black in color, according as it is mixed with blood, cerumen, epithelial debris or micro-organisms. The discharge may be thick, creamy, mucoid, or watery in character. The discharge may cease entirely for intervals and then recur. Pain is an infrequent symptom in connection with this form of middle ear affection. Pain may be occasioned by an acute exacerbation, by granulations, filling in the perforation, thus preventing free escape of pus, and through the accumulation of purulent discharge in the antrum mastoideum. Caries and necrosis of mastoid and osteosclerosis are accompanied by pain over mastoid and parietal regions.

A frequently recurring head symptom is the feeling of pressure, or actual headache, often a symptom of increased labyrinth pressure or hyperemia of the meninges. Vertigo is occasionally present. Vertigo, with unsteadiness of gait and vomiting, is usually indicative of caries and necrosis, although it may be produced through inter-labyrinth pressure. The most serious case of vertigo, vomiting and total inability to locomote that I ever saw was due to a small growth in the region of the oval window, which was completely relieved by its removal. Subjective noises are occasionally present, but are not so constant as in the adhesive form of catarrh of the middle ear. They are seldom continuous.

Alteration in the sense of taste is also noted as a result of changes in the chorda tympani nerve.

The amount of impairment of the hearing varies greatly. The degree of the impairment of hearing varies also in the individual case at different times and under varying circumstances. The degree of the impairment of the hearing is dependent on the amount of primary injury; on the secondary changes which result through the persistent suppuration; and on sclerotic and degenerative changes. In the individual case the variation in the hearing is dependent upon the weather, the amount of the discharge, the catarrhal condition of the

Eustachian tube, the greater or less activity of the inflammation in the tympanic cavity, and granulation and adhesive changes about the ossicles and windows. It is frequently noted that individuals hear fairly well as long as there is a moderate discharge, who become quite deaf when the discharge ceases.

The conditions of the membrane and visible portion of the tympanic cavity vary so in this disease that it is almost impossible to give a typical representation of this lesion. The appearances also vary according to the activity or non-activity of the inflammation. The position of the perforation is most frequently the anterior-inferior quadrant, then the posterior and superior quadrant, while frequently the whole membrane is destroyed. The rarer form of perforation is that through Shrapnell's membrane. The form of the perforation also varies greatly. It may be circular, oval, kidney shaped or irregular in outline. The number is subject to only slight variation. One perforation is almost the rule, although we occasionally have two, and very rarely multiple perforations. The size of the perforation varies from that of a pin-hole-like destruction to the loss of every vestige of the membrane.

The appearance of the remaining membrane varies greatly during the active stage. It may have a dull white appearance, due to thickening of the epithelial layer or chalk deposits. The color of the membrane may show also a yellowish red to one of intense congestion. The border of the perforation is usually more highly colored than the remainder of the membrane. The tympanic cavity shown through the perforation gives evidence of varying degrees of congestion and infiltration of the mucous lining. The periphery of the perforation in the membrane may be free or it may be adherent at any one or more points throughout its circumference to the inner tympanic wall; also fibrous bands may be formed between the membrane at the edge of the perforation and the tympanic wall. The long process of the malleus often becomes adherent to the promontorium. As a result of great activity in the mucosa and the formation of villous prolongations from the same, as well as from the result of caries, we occasionally have the development of

granulations or polypi on the tympanic wall; from carious ossicles we have the same result. These growths, when small, manifest themselves as slight elevations from the mucosa, giving off a distinct light reflex; when large they project from the antrum, or attic, into the auditory canal, and can be readily recognized as distinct blood-red tumors which bleed readily when touched. The auditory canal may not only be the seat of a dermatitis from the irritation of the discharge, but there may also develop from its wall granulation masses. Atresia of the auditory canal is also an infrequent condition. In making a diagnosis of chronic suppurative otitis, it is essential that the auditory canal and the tympanic cavity should be freed from all presence of purulent discharge. The cleansing can be made either through the use of the cotton-holder or by the use of mild irrigation. Where the discharge is so limited in quantity as simply to form a hard blackish crust around the perforation and the circumference of the auditory canal, due care should be exercised in the removal of the crusts, as the granulation tissue on which they rest may bleed, and thus prevent a thorough inspection of the disease. The circumference of the perforation, the condition of Shrapnell's membrane, the presence of all or absence of any of the ossicles and the condition of the changes within the tympanic cavity should be noted at this inspection. The region should then be carefully gone over with a probe for the purpose of detecting caries or necrosis.

XXI.

THE TEACHING OF OTOTOLOGY TO THE UNDER-GRADUATE MEDICAL STUDENT.

BY ALEX. RANDALL, M. A., M. D.,

PHILADELPHIA, PA.,

CLINICAL PROFESSOR OF EAR DISEASES IN THE UNIVERSITY OF
PENNSYLVANIA, ETC.

The place of otology in the medical course is as yet a matter by no means well defined, and the fault lies largely with the teachers themselves. The specialist has been too often inclined to teach otology as a specialty; and the instructors in other departments have quarreled not only with this view, but even with the rational one that no department of medicine should be neglected in the preparation of the medical graduate. Mankind will long maintain the habit of wearing ears, whether decorated in semi-barbarous fashion or not, and equally long will demand that the affections of these organs shall be rationally treated. To this end, diagnosis is absolutely essential, and should not be left to the specialist alone. "Physical diagnosis" should not be limited to the auscultation and percussion of the thorax and abdomen; but as rightfully includes the exploration of such essential parts of the organism as the upper air passages and their accessory apparatus, such as, in many of its relations, is the ear. The stethoscope should no more than the microscope, the ophthalmoscope, the otoscope or the laryngoscope be the sole instrument of the general practitioner. Because the student or the young practitioner cannot be expected to master the utmost refinements of diagnosis with all or any of these instruments is no reason why he should be limited to doing imperfect work with the stethoscope alone since this may leave him the more in need of additional data obtainable by the other methods of physical exploration.

It is an unfortunate fact that the majority of teachers of so-called "physical diagnosis" are not competent to instruct in laryngoscopy and otoscopy; still worse, some of them seem to glory in the fact, and, like the tailless fox, try to maintain the fashion of a like abbreviation of the medical equipment of others. But every thorough practitioner must frequently realize his need of the facts which can be obtained only by these examinations, and, if incompetent to make them himself, must call in a specialist to aid him. It need hardly be urged that the beginner in medicine can ill afford to proclaim his imperfect medical education by frequently calling for help even to *study* his cases; and the result will too often be that he will proceed under guidance of his fancy rather than of the facts. Many treat conditions which may be wholly misunderstood or unrecognized upon the assumption that the eye, the ear or the throat are *special* organs which it is not their duty to consider. It is very important, therefore, that otologists and laryngologists should follow out the lines suggested by Dr. McKenzie in his address as Chairman of the Section on Otology and Laryngology, of the American Medical Association, three years ago, and by clarifying their own views and simplifying their demands shall make it feasible to introduce a proper amount of these studies into the general medical course. No medical school can afford to have its graduate fairly say that he was not taught how to examine the ear or the throat; and it ought to be a matter of course that practical exercise in the examinations should be given to each individual, not by diagram or model, but on the living patient. Nor is the study to be valued solely in relation to the facts learned as to the ear, nose or throat; but the education of hand and eye becomes of great importance in other branches and will be of daily use to those who may limit themselves to another specialty.

Every student of medicine should receive, in the latter part of his course, individual instruction in ear work; and this need not entail much, if any, addition to the crowded schedule of the present course. One hour closely devoted can suffice to instruct him in the management of the brow-mirror, of the speculum, of the throat-mirror, and of the probe for the investigation by sight and touch of the organ

of hearing. He can be taught the examination of the hearing by the voice, and by tuning-forks in the essential tests of Rinne, Weber, Gardiner Brown and Politzer; he can be shown how properly to syringe an ear for the removal of cerumen or foreign bodies, or for the cleansing away of pus; how to dry and mop it, and how to make applications at the fundus and insufflate powders. He can be taught to spray the nasal chambers, to mop and cleanse the vault of the pharynx and the tube-mouths, to pass the Eustachian catheter and inflate with it or by the Politzer method; and this with coincident instruction as to the diseased conditions demanding such procedures. One hour thus spent will hardly serve to fasten these matters in his mind—still less give him facility in them; but if they are kept before his eyes by a simple system of wall-charts, these procedures, their teachings and their therapeutic results can be readily impressed upon him; while one hour of clinical work can bring before him a dozen various affections of the ear and acquaint him with their symptoms and treatment. In small sections the simpler operation of mastoid opening for acute empyema can be well illustrated on the living patient, if available, or on the cadaver. Then a half-dozen well-illustrated lectures to the entire class can sufficiently present all the common forms of ear disease and that part of the anatomic instruction requisite for their due comprehension and management.

Upon this minimum of eight to ten hours for every student any desired additions can be made to clinch the matters in the memory and to broaden the comprehension by wider observation. But it is surely fair to say that otology is a branch of surgical practice in no respect inferior in importance for the general practitioner to that of fractures; and we may well demand that an equal amount of time, say ten hours at least, shall be accorded to it. To make this minimum of fullest avail will demand the most zealous and skilful work of the instructor, since one or two hours of it must be absolutely individual and one or two more given to small sections. The best apparatus, in the form of ample stereopticon, or chart or model-illustrations, must be employed in order to make instruction to the larger groups really valuable. The electric otoscope can, in a reasonably brief time, demonstrate to

a score of men in succession the clinical aspects of the drum-head, but this is hardly feasible with large classes. The ear-models in general use are better for showing the systematic anatomy than for bringing home to the practitioner those points of real importance, not only in surgical operation, but especially in the daily routine of topical treatment; and the charts generally attainable have grave shortcomings. Each teacher will do well to devise for himself a set which shall meet his demands; and a few pounds of modeling clay worked up with the fingers can furnish a series of models more valuable for demonstrating practical details than any that can be purchased.

XXII.

A FEW REMARKS ON SOME EVERY-DAY EAR CASES.*

By J. E. SHEPPARD, M. D.,

BROOKLYN, N. Y.

As a basis upon which to construct this paper, I have taken a recent 1000 cases which furnished me with 1581 diagnoses. Of these latter, 658 concerned the middle ear, of which 134 were chronic catarrhal otitis media (O. M. C. C.). The internal ear alone was involved 57 times, and in 177 there was mixed middle and internal ear disease.†

From these three groups of cases it has been my endeavor to learn some facts, and to draw some conclusions, and possibly to evolve some questions that we may with advantage make the basis of discussion.

To show the ages at which the individuals in these groups presented themselves for treatment I append the following:

Otitis Media Catarrhalis Chronica.

0-10.....	6
11-20... ..	12
21-30.....	30
31-40.....	38
41-50.....	30
51-60.....	14
61-70.....	3
over-70.....	1

*Read by title at the meeting of the American Laryngological, Rhinological and Otological Society held in Lexington, Ky., April 29 and 30 and May 1, and published in the Brooklyn Medical Journal, July, 1903.

†For convenience in this paper I will designate the O. M. C. C. cases as group A; the Ot. M. et Int. cases as group B; and the Ot. Interna cases as group C.

Otitis Media et Interna.

0-10.....	2
11-20.....	2
21-30.....	25
31-40.....	46
41-50.....	30
51-60.....	35
61-70.....	28
over-70.....	9

Otitis Interna.

0-10.....	5
11-20.....	4
21-30.....	8
31-40.....	15
41-50.....	11
51-60.....	6
61-70.....	4
over-70.....	4

Thus of group A, 98 cases were between 20 and 50, the decade from 30 to 40 showing the largest number, 38; of group B, the decade from 30 to 40 again shows the largest number, 46, others between 20 and 70 being relatively even; of group C, the largest number, 15, is again found between 30 and 40, with otherwise a relatively even distribution between 20 and 60.

Of group A, 20 cases were entered as without complication, or accompanying conditions; where these existed, the most frequent were naso-pharyngitis (mostly more or less hypertrophic) 49 times, tubal catarrh and stenosis 27 times, septal exostoses (spurs, etc.) 25 times, hypertrophy of tonsils, faucial 3rd. and 5th., 14 times, hypertrophic rhinitis 6 times, dental neuralgia 6 times, and impacted cerumen 5 times.

The cases in group B were put down as O. M. C. C. et Int, 44 times (indicating slight involvement of the perceptive apparatus); Ot. M. et. Int. 92 times, indicating a more nearly equal involvement of the two portions); O. M. P. Resid. et Int. 14 times, while aural neurasthenia was specifically mentioned as accompanying the O. M. C. C. 20 times, and anemia of labyrinth 3 times, with a few other scattering accompanying conditions.

In group C the diagnoses were aural neurasthenia 17, otitis interna 18, presbycusis 4, anemia of labyrinth 5, concussion of labyrinth 4, meningitic deaf-mutism 2, labyrinthine tinnitus 4, Meniere's diseases 3.

As to Etiology: In O. M. C. C. the trouble was attributed 111 times to conditions in the nose, throat and eustachian tubes, and in 21 cases no evident cause could be traced. In the *mixed* cases it was attributed to nose, throat, and tube conditions 42 times, to neurasthenia 50, to neurasthenia *and* nose, throat, and tube conditions 32, to neurasthenia and other general conditions 4, general diseases 15, anemia of labyrinth 3, old age 5, syphilis 4, fracture of temporal bone, quinine, and tobacco each 2, and unknown 16. In otitis interna, to neurasthenia 17, nose, throat, and tube conditions 4, anemia 7, syphilis 5, trauma 4, old age 4, organic nerve disease 5, other general diseases 2, tobacco 2, hemorrhage (Meniere's disease) 3, sea-bathing 1, and unknown 3.

The *general condition of health* was investigated, with the following results:

In group A:—Good 80; grippe recently, head-colds, sore throat, asthma, etc., 15; stomach trouble, indigestion, uric acid, rheumatism etc., 9; more or less nervous 7; neurasthenic, tire easily, etc., 9; kidney trouble, anemia, etc., 4; more or less general debility 7; syphilitic 1; tubercular 1; menopause 1.

In group B:—good 69; more or less neurasthenic 49; more or less nervous 10; organic nerve disease 5; more or less general debility 11; menopause, uterine trouble, etc., 3; frequent head-colds 3; stomach trouble, uric acid, etc., 11; syphilitic 6; Bright's disease 1; anemic 4; frequent headaches 3; prolonged cough 2.

In group C:—Good 17; more or less neurasthenic 18; anemic 5; more or less general debility 6; syphilitic 4; organic nerve disease 2; menopause 1; malarial 1; kidney disease 1; intensely nervous following removal of goitre 1; nervous from excess of tobacco 1.

Of occupation: Group A:—Unknown 8; minors 10; at leisure 9; housewives 35; mercantile life 34; professional life 25; mechanics, out of door work, etc., 13.

Group B:—Unknown 9; minors 2; at leisure 17; housewives

57; mercantile life 35; professional life 33; mechanics, out of door work, etc., 24.

Group C:—Unknown 2; minors 6; at leisure 8 housewives 15 mercantile life 11; professional life 7; mechanics, out of door work, etc., 8.

As to presence or absence of obstructive nasal or naso-pharyngeal conditions, or of some non-obstructive source of inflammation of nasal or naso-pharyngeal mucosa:

In group A:—Obstructive conditions now, 32; clear history of previous obstructive condition 6; hypertrophic, but non-obstructive conditions, 45; intra-nasal pressure (spurs, etc.), 30; in addition to the latter, but already counted among the obstructive conditions 7; no history of such condition 21.

In group B:—Obstructive conditions now, 24; clear history of previous obstructive conditions, 6; spurs causing pressure 25; spurs not making pressure 16; hypertrophic, but not obstructive, rhinitis, rhino-pharyngitis, etc., 37; no history of such conditions 73.

In group C:—Obstructive conditions now, 3; clear history of previous obstructive conditions 2; spurs making pressure 6; spurs not making pressure 6; naso-pharyngitis 5; no history of such conditions 35.

As to the involvement of one or both ears:—

In group A:	Both	-	-	-	-	106
	One	-	-	-	-	28
In group B:	Both	-	-	-	-	154
	One	-	-	-	-	23
In group C:	Both	-	-	-	-	43
	One	-	-	-	-	14

Result of treatment:

In group A:

Not treated more than 3 times	-	47
Remained stationary	-	27
Improved slightly	-	23
Improved distinctly	-	37

In group B:

Not treated more than 3 times	-	83
Remained stationary	-	44
Improved slightly	-	29
Improved distinctly	-	21

In group C:

Not treated more than 3 times	-	48
Remained stationary	- - - -	2
Improved slightly	- - - - -	2
Improved distinctly	- - - - -	5

There are certain facts to be gathered from these data which are more or less significant. Perhaps the first striking fact is the number of *mixed* cases as compared with the O. M. C. C. cases, viz., 177 of the former as contrasted with only 134 of the latter; again, there are more than 2/5ths as many cases of involvement of the perceptive apparatus alone, as of O. M. C. C., viz., 57 to 134. Unless I am mistaken the impression generally prevails that O. M. C. C. greatly outnumbers the other conditions, an impression due, I must believe, to an insufficient use of the differentiating tests. By this term I mean, for daily use that the absolute duration and relative intensity of a series of tuning forks should be secured in all cases examined for comparison with the normal standard, and a more or less accurate determination of the high and low tone limits. Hence, since the treatment of these various groups differs in some degree, the conclusion is inevitable that, for the best results in all our cases, an accurate diagnosis is essential, a truism which in my judgment is too often overlooked.

As a question for consideration I would ask, why is there so frequent involvement of the perceptive apparatus? As a tentative answer I would suggest, first, the exhausted nervous system due to the all-too-strenuous business and social life of the present day; and in the second place, possibly, the constant noises big and little, by which we are surrounded in our daily city life.

A second fact to which I would call your attention concerns the age of these patients; in all three groups the decade containing the largest number of cases is the same, viz., that from 30 to 40; along with this must go the further fact that in the *mixed* cases there is relatively a much larger number appearing after 50 years of age than in either of the other groups. Possibly the following conclusion are justifiable: Group A and group C have no connection with one another in any way; further, perhaps in a considerable proportion of group B, the involvement of the perceptive apparatus has been

preceded by the O. M. C. C. condition, but that such involvement is an extension inward of the O. M. C. C., as I believe to be largely held, I am exceedingly doubtful.

Question: may it not rather be a simultaneous involvement of the internal ear, due to some other cause?

Along this same line, under the heading of etiology we come upon these facts: in group A, as we would expect, about 5/6ths are directly attributed to conditions of the nose, throat, and Eustachian tubes; in group B these same parts find mention in less than half the total number, while neurasthenia and other general conditions loom up as important factors in about 2/3rds. of the cases; while in group C the nose, and throat conditions dwindle to 4 in 57 cases, and the trouble is referred to general conditions in about 85 per cent. of the total. These facts seem to me to bear out virtually the conclusions stated above. In this connection the question may perhaps be properly asked, what proportion of our middle ear catarrhal cases in adult life can properly be referred to adenoids in childhood? I must say that the impression grows upon me that this is true of a very large proportion of them; and if so then the conclusion is inevitable that the more universally they are removed, the more is being done in the way of preventive medicine.

In regard to the *general condition of health* it seems to be a fact that of group A, 60 per cent were in good health, this being true of only 38 per cent. in group B, and of 30 per cent. in group C. Of the 40 per cent., O. M. C. C. cases out of health the respiratory and the nervous system were affected in about equal numbers, with the gastro-intestinal tract affected in a majority of the remainder. Out of the 62 per cent. *mixed* cases 37 per cent. suffered from some trouble affecting the nervous system, leaving 25 per cent. suffering from gastro-intestinal disturbance, general debility and other general conditions. Out of the 70 per cent. otitis interna cases out of health the general nervous system suffered in about 45 per cent. leaving 25 per cent. affected with general conditions of one kind or another.

These figures would seem to coincide more or less closely with what we would expect in this direction.

I find no especially significant fact under the heading of

occupation excepting only this—There is not a telephone operator in this whole group of cases. From this fact one of two conclusions may be drawn, either some one else has a pull with the "Hello" girls, or else their work does not conduce to ear trouble.

Question: Is there, or is there not, any foundation for the idea, which I believe to be rather largely held, that the work of a telephone operator is productive of more ear trouble than are other occupations? May it even be possible that by the shutting out of other noises and the more or less constant vibratory massage of a certain character, that the tendency is toward the prevention of this class of ear troubles?

In group A, some nasal or naso-pharyngeal condition (obstructive, hypertrophic but non-obstructive, irritating pressure, etc.), existed in 84 per cent. of all the cases; in group B, 55 per cent.; in group C, 40 per cent.

Both ears were involved in 78 per cent. of the first group, 87 per cent. of the second group, and 75 per cent. of the third group.

In these facts there is perhaps nothing different from what we would expect to find.

When investigating the *results of treatment*, I was at first rather startled to find the number of cases that had not come more than three times for treatment, this number having been taken in a rather arbitrary way, in the belief that without more than this much treatment no result could be expected. But when we consider the not altogether brilliant outlook that we, to be honest, must hold out to these patients, it is possibly not surprising that as many as 35 per cent. (as in group A) should go further and fare worse at the hands of those who promise to cure them in a month. Taking out then these 47 cases, we are left with 87 who underwent treatment, and of these only 30 per cent. remained entirely stationary, 70 per cent. showing more or less improvement, 42 per cent. being put down as showing a distinct gain.

Of the *mixed* cases 83 out of 177 received only three treatments or less. Of the remaining 94 who had some treatment, 44, or a little less than 50 per cent., remained station-

ary, the other 50 per cent. receiving more or less benefit, 21 per cent. of them showing distinct gain in hearing.

Of the third group 48 out of 57 did not remain under continuous treatment, to account for which several factors must be considered; in the first place, in a considerable number of the cases there was absolutely no chance of the conditions being bettered and the patients were so informed at the time of the original examination. Again, among those which may be benefitted, as a rule no local treatment is required, and it has been my general custom to refer such cases back to their family physician, to whom a report is made of the findings in the case, and suggestions made as to treatment. Thus I have left only 9 cases in this group who have continued under my treatment; of these 2 have remained stationary, 2 have improved slightly, and in 5 there was a distinct gain in hearing.

The facts are, then, that more or less improvement was obtained in 45, 28 and 12 per cent. respectively of the total number of cases in the three groups, while, in the cases which were really treated, more or less improvement resulted in 69, 53 and 77 per cent, the improvement being considerable in 42, 22 and 55 per cent. respectively.

That there is nothing brilliant about these results I am well aware—at the same time they are to me at least an incentive to persevere and to try for better results in a class of cases which, untreated, is almost sure to grow steadily worse, and which it was the custom not so very many years ago to advise against treatment. But let us at the same time by all means do what we can, as intimated above, to prevent by removal of adenoids, the development of a condition for which we can do relatively so little. The plan of treatment seems to me beyond the scope of this paper. There is no definite plan; perhaps I might sum it up by saying that tireless patience and perseverance are needed, together with a removal of all the causes so far as possible, especially the local ones, alternating periods of local treatment and freedom from treatment and constant watchfulness of the general health.

XXIII.

A CASE OF TUBERCULAR LARYNGEAL STENOSIS TREATED BY TRACHEOTOMY.

By J. PRICE-BROWN, M. D.,

TORONTO.

Laryngeal tuberculosis as a sequence to pulmonary tuberculosis is of such common occurrence that I would not have taken the liberty to present the report of a case to the Fellows of this Society, but for its unusual history, and the remarkable condition of the patient at the present time.

On April 2, 1901, Mr. T. D., piano-builder, age 30, was referred to me by Dr. Thos. Kerr, of Toronto. He had been under treatment for two or three years for dry cough, and for several months his throat had been sore, resulting in odynophagia and dysphagia. There was also dyspnea on lying down, and constant partial aphonia. For some time he had been subject to night sweats. Appetite was gone. Pulse on examination was 120, respiration 24, temperature $99 \frac{3}{5}$, weight 117 lbs. There was frequent, almost noiseless cough, racking the body, but attended by little solid expectoration. There was chest soreness but no pain. Whether it was due to the lack of solidity in the sputum or not, microscopical examination of a specimen at the time failed to reveal the presence of tubercle bacilli.

There was no family history of tuberculosis. Neither was there personal history of syphilis.

Examination: Nose normal; pharynx catarrhal and hyperemic; larynx infiltrated, particularly left side of epiglottis rendering examination of vocal cords difficult. There was ulceration along the margin of left vocal cord, slight abrasion of left arytenoid and ary-epiglottic fold. The whole larynx bathed in muco-pus.

There were no rales in chest but bronchial breathing, par-

ticularly on left side, with prolonged expiratory murmur; dullness on percussion over left upper lobe anteriorly; vocal exaggeration so far as could be discerned from imperfect condition of voice.

As the larynx presented the most prominent symptoms, the treatment was mainly directed toward the relief of that organ.

This consisted of the daily use of an alkaline spray, followed by one of menthol in albolene 5 per cent.; and also every third or fourth day, in the application by cotton holder of 50 per cent. solution of lactic acid.

Following the laryngeal treatment each day in the office, the patient took inhalations first of hot air and second of mentholated air.

Internally, compound syrup of hypophosphites was given; also during the summer, cod liver oil, iron and creosote. Of course this part of the treatment varied from week to week according to circumstances.

By May 12th the patient had improved considerably. The voice was still aphonic, but the infiltration had abated somewhat, the larynx was cleaner, and the ulceration on the cords looked healthier. Swallowing was easier, night sweats had ceased, the respiration was freer. Appetite had improved, and the temperature never rose above $99\frac{1}{5}$. Weight had increased to 123 lbs.

On May 13th he had a chill, followed by rise of temperature to $103\frac{3}{5}$ deg. In a couple of days this abated, and symptoms were favorable again.

By June 5th the condition had improved so much that I sent him to Dr. Powell, examining officer for the Gravenhurst Sanatorium, with the hope that he would be admitted into that institution for the summer months. The doctor wrote me in reply, that the Sanatorium was open only for cases in the first stages of tuberculosis; and that as a consequence, my patient was ineligible. He found considerable deposit in the right apex, extensive consolidation in the left apex, and down the posterior side of left lung as far as the seventh rib. The condition of the larynx and bad heart also, combined to make the case altogether too hopeless to be admitted.

Failing to get in, the patient on my advice secured a tent

and put it up in his back garden. Here he tented for a month. Then he went to Muskoka, took the tent with him, and occupied it from that time on until November. In the latter month it was very cold, and having no stove with him, he, each night carried a heated brick from a neighboring house to warm his bed before retiring. The following morning he would sometimes find water frozen an inch thick in his tent when he rose to dress. Notwithstanding this, his health improved; and on returning to the city I advised him to put his tent up again in his back yard—place a little stove in it—and live there all winter, which he did.

During that winter he came occasionally to the office for treatment. All I did for him was to repeat the menthol spray to the throat and order a continuance of the tonic treatment.

By May, 1902, or eleven months after he was refused admission into the Sanatorium, although still voiceless, he had so far improved, that on examining him again, Dr. Powell advised that he be admitted. His weight was then 130 lbs. At this time tubercle bacilli were found in the sputum.

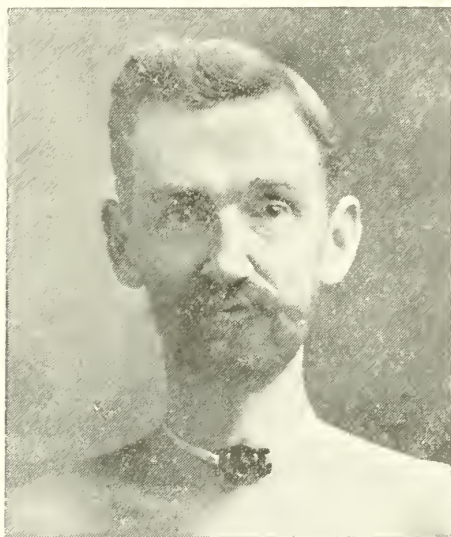
Mr. T. D. remained at the Sanatorium until November last, a period of six months, when he returned to my office with a letter from the house physician. Dr. Elliot stated that the patient had passed an excellent summer, still further increasing in weight, that his lungs had materially improved, that the expectoration had become less, and very few bacilli could be found in the sputum. He had a chest expansion of over three inches. During the last three weeks, however, infiltration in the larynx had increased and stenosis was becoming very severe. He closed by stating that relief from impending suffocation was urgently required.

On examination I found the patient's hands were cold, his skin cyanotic, and his breathing labored and stertorous. These symptoms were said to be much worse at night time.

On using the laryngoscope I found the epiglottis right down to the tip enormously infiltrated, particularly on the left side. It was tilted backward, hiding completely the arytenoids and vocal cords from view.

It seemed to me that the only possible relief that could be given would be by tracheotomy; and that this measure was

justifiable, in view of the fact that the lungs presented so few urgent symptoms. I was well aware that some authorities, particularly the late Lennox-Browne, disproved of opening the trachea even in the worst cases; and it was with some trepidation that I ventured to operate. The hope was, as there was little expectoration from the lungs, that the cough would subside; and that the larynx, being freed from the irritation of breathing, would be benefitted by the complete rest which tracheal respiration would insure.



Hence, on Nov. 10, 1902, I did tracheotomy, Dr. McDonagh kindly assisting, with Dr. Kerr as anesthetist.

There are several points in connection with the operation that I would like to mention. Although a high tracheotomy it was an unusually difficult one, owing to the low position of the larynx, and the fact that the lower end of it and the trachea seemed to tip backward deeply in the neck. The first point will be noticed in the accompanying photograph.

The after effect was that the fenestrum in the silver tube used, came directly below the cricoid instead of into the

trachea; and whether from pressure upon the open edge of the tube or the pressure of tubercular diseases in the cartilage, part of it sloughed away, leaving a notch in the lower margin of the anterior side of the ring.

When I discovered the sloughing, I tried different rubber tubes; but the fenestrum, even when farthest removed from the external end, always seemed to do harm. Consequently, I finally discarded the fenestrated tubes altogether; and the one he has worn now for two months or more has no opening in its upper side.

From the time of the operation the laryngeal symptoms slowly improved. Still the temperature occasionally rose to 100 degrees, and several times he had night sweats; though I think these drawbacks arose mainly from the difficulty in procuring a thoroughly satisfactory tube.

Other treatment was practically nil—the objects being to give the larynx perfect rest and to build up the system by an abundance of nutrient food. His room was well ventilated and there was evaporation of moisture from a pan of hot water. This, however, was so slight that I do not believe it affected the case materially. The only throat treatment was an occasional spray of 5 per cent. menthol in albolene.

For some time he continued to run down in flesh, and it was not until he got thoroughly adjusted to the new condition of things that this ceased. He then weighed 125 lbs.

From that time onward, although winter, he went regularly out of doors; fever abated and practically disappeared; expectoration through the tube and throat became less; and he steadily gained in weight.

Present condition: He still wears the tube. If taken out the stenosis is too great to admit of reasonable respiration. When he closes the tracheal opening with his finger he can speak in an intelligible guttural tone. For many weeks his temperature has at no time been above the normal. He sleeps and eats well; and has no difficulty whatever in swallowing. His weight is 140 lbs, as heavy as he ever was in his life. Recent microscopical examination of the discharges through the external opening and from the throat, being the accumulations of over twenty-four hours, were negative. No tubercle bacilli could be found. The patient manages the

tubes himself without any difficulty, and takes one or both out for cleaning purposes whenever required.

The infiltration of the epiglottis has very much diminished; but the left side which was so enormously infiltrated has shrunk to less than normal size. The whole organ is shortened in length. At the same time it has contracted horizontally backward and downward, so that it still completely hides the vocal cords from view. There are no visible ulcerations; neither is there any appearance whatever of cicatrix. The muco-purulent secretions around the larynx have almost disappeared.

The patient has again taken his tent up north to Muskoka and proposes spending the summer there. When he returns my present intention is to attempt the removal of the laryngeal stenosis by the use of graduated intubation tubes.

Perhaps one or two other results of observation, in treating this case, are worthy of notice.

First, the facility with which oleaginous sprays enter the larynx. When treating the patient at my office, I have frequently taken out the entire tube, cleaned and dried the opening into the trachea and then with compressed air and the down tip, sprayed the larynx with metholated albolene, instructing him to inhale at the time. While in the act of spraying, the oil would trickle out of the opening and down the neck. This would invariably be the case if the spray was at all profuse.

Second, although we all admit that the moisture of the nose is requisite to prepare the air for respiration; yet this man, suffering from combined pulmonary and laryngeal tuberculosis, has for nearly six months breathed practically dry air into his trachea, not only with impunity, but with actual benefit to his tubercular condition. Not only that, but although I have had the tube out dozens of times and examined the parts carefully, I have never found the trachea or even the passage to it in a dry or irritable condition.

Third, while in a case like the one I have had the honor of reporting, tracheotomy is the best and perhaps the only means of affording relief, in the majority of cases of laryngeal tuberculosis, it would be too hazardous to be worthy of trial. When cough does occur, it is very ineffectual, and distressing to the patient; and I can readily believe, from watching the course of this case, that in severe pulmonary disease attended by copious discharges, the distress produced by coughing and expectoration would be only aggravated by the presence of a tracheal tube, and in such instances tracheotomy would be worse than useless.

XXIV.

MASTOID DISEASE AND MENINGITIS.

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The increased attention and critical study of the cerebral complications of aural affections and the brilliant results obtained by the prompt recognition of the nature of the brain lesion or lesions, with the adoption of efficient and radical surgical measures, have led to the obvious conclusion that in many cases of meningitis, the primary origin of the affection could be directly traced to some portion of the auditory apparatus. Friederich has clearly emphasized this view in his statement that the importance of aural disease in the production of secondary diseases of the meninges cannot be overestimated, and the portion of otitic cerebral disease now forms one of the most important chapters of otology.

In practically all the cerebral complications of mastoid disease, with the possible exception of isolated, deep brain abscesses, the presence of inflammation of the meninges to a greater or lesser extent, accompanies the more prominent lesion of the former are masked by those of the latter, or the brain membranes are involved to such a slight extent that recognition is impossible. When the external pachymeningitis, as will be seen later, remains localized and is the result of infection with pus producing organisms, the condition assumes that of an epi- or extradural abscess and as in the particular instance, the condition is primarily one of meningeal irritation, followed by the local pus collection, so may the pathologic process possess an obverse aspect and the

meningitis may be but the result, especially when extensive beyond its boundaries and producing a condition that is rapidly fatal in a short time.

During the course of a mastoid empyema and most frequently in young children, a condition of meningismus or pseudomeningeal symptoms may develop and the difficulties surrounding the selection of proper treatment will be almost insuperable, until a sufficient time has elapsed in order that the value of the various symptoms may be correctly interpreted. Such a case came under my observation several years ago, where in consultation a child of seven years was seen with a history of a purulent discharge from the right ear for one year following scarlet fever. Five days before coming under my observation, she had been exposed to a draft, and during that night she was awakened by intense throbbing pain limited to the mastoid region of the same side. The aural discharge rapidly diminished in amount and within twenty-four hours had practically ceased and the mastoid showed beginning swelling of the soft tissues. The child at my first examination was worn out with constant pain, the mastoid process was exquisitely tender to the slightest touch and was red and swollen. There was a large perforation in the posterior segment of the membrana tympani and remains of inspissated pus in the canal and middle ear. The symptoms calling attention to apparent meningeal involvement were intense headache limited to the right side and especially referred to the temporal and occipital regions. The temperature was 103 degrees and had been 100 1/2 in the morning, while the entire symptom group indicated an intracranial extension of the infection. Immediate operation was advised, but was absolutely refused, so ice dressings were applied to the mastoid, the canal and middle ear were irrigated at frequent intervals with a normal salt solution, and free drainage was established from the middle ear by removing the retained purulent material and enlarging the opening in the drum. Complete recovery promptly ensued and after a lapse of three years the child has had no further trouble with the ear. While this case recovered, such a result cannot be expected as a rule and while it is here cited to demonstrate the prompt subsidence

of meningeal irritation in this particular instance, yet operation would have been equally successful and would have removed the dangers in the future to which she may be subjected, from the presence of the suppurating middle ear, which still remains.

The meningeal irritation may not necessarily advance as far as a true inflammation, but the symptoms may be caused by congestion and edema of the brain coverings, but this at first, and especially in the absence of operative treatment, is practically indistinguishable from an infective intracranial inflammation, except by a careful study as shown by the course of the disease. The meninges may be invaded either from the middle ear or by the involvement of the mastoid process, and it is with the latter especially that we have here to deal, although it is almost impossible in cases where the destruction of tissue is extensive to determine the exact path of infection with any degree of certainty.

The proportion of reported deaths from the intracranial complications of aural disease and especially as regards the relation of the mastoid and meningitis, is suspiciously small, yet we think were due credit given to the aural origin of many fatal cases of meningitis associated with abscess and sinus phlebitis, the proportion would be materially augmented. Especially is this so in children where the presence of a meningitis accompanying an acute or chronic auditory infection is not at all uncommon. Gruber found in 40073 hospital deaths of all kinds, intracranial disease in 1806, and of these 232 were caused by disease of the ear, while meningitis was present in 115 instances. A fact of considerable interest elicited in this connection was that of the latter number dying of meningitis, the male sex greatly preponderated, 87 being males, while but 28 were of the opposite sex. Korner in 151 observations found diffuse meningitis in 23 as the predominant pathological change, and in many other complications patches of adjacent meningitis were constantly present. This is shown by the condition of the meninges in brain abscess, as a large proportion of these pus collections, which can be safely estimated, at least one-third, are the direct result of otitic disease, the infection having been carried by means of the meningeal tissue. As further showing the pres-

ence of this factor, McBride in 44 cases of fatal ear disease found 12 who died of meningitis and in 3 which were classed as brain abscess on account of the predominating symptoms of that affection, there also existed a condition of diffuse meningitis. The large statistics of Barker, embracing 72000 cases of all kinds of disease, show 45 fatal cases due to ear disease. In a study, which he made of 50 fatal cases, 72 per cent. were due to the association of meningitis and pyemia. This author asserts that of the ordinary complications of ear disease, more than nine-tenths probably consist of meningitis, septic phlebitis and pyemia.

While the brain envelope may be involved in limited or extensive areas dependent upon the degree of the infection, the variety of the inflammation may be different in some cases and the ordinary pachymeningitis may be present either as the internal or external variety. Cerebro-spinal meningitis may also exist at the same time as a mastoid empyema, but no relation usually can be traced between the two, and as the effects of cerebro-spinal meningitis are produced secondarily upon the ear and are not the result of infection from the auditory apparatus, they will not here be considered.

As regards infection, practically but two forms of otitic meningitis may be considered, the first resulting from infection by absorption into the circulation and differing from many cases, inasmuch as the exact path by which the morbid material is carried from the ear to the meninges is unknown; while the other variety depends upon the extension of the inflammation by continuity from the mastoid region to the dura and from there to the other membranes enveloping the brain. The former variety is rapid in its onset, usually diffuse and once established is necessarily fatal, while the latter form consists of a gradual process, usually localized in its incipency and when diagnosed early is susceptible of cure by a radical operation. Poli relates a remarkable case of the former variety in which the rapid diffusion of the infection to the meninges and the entire cerebro-spinal axis was most astonishing. Purulent leptomeningitis therefore is usually fulminating, sets in suddenly and terminates in but a few hours, or may continue before a fatal issue ensues, for several days; while the localized focus analogous to an epidural

abscess, is more or less chronic, with mild symptoms, which may apparently intermit from time to time before a regular course is established and may last for several weeks or even months.

The internal form of pachymeningitis corresponding to the subdural or intradural abscess, is comparatively rare and is usually the result of a circumscribed area of dural inflammation becoming softened, corroded and perforating, with the deposition of exudation and infective material in the subdural space. Under these conditions should the pia and arachnoid become agglutinated to the dura, pus may accumulate in this situation and exist as a subdural abscess with softening and disintegration of the adjacent brain tissue. Should the membranes however not limit the spread of the infection, a general diffuse leptomeningitis will necessarily ensue.

In addition to the acute inflammatory changes of the meninges, a serous form has also been described, and, like the others, may originate from an otitis and compel surgical intervention. Mueller has paid especial attention to this variety and describes two cases occurring in his practice, in both a diagnosis of cerebral abscess was originally made, but no pus collection was found on operation. He considered the condition in one to be that of a chronic serous external meningitis, and an acute internal serous meningitis in the other. The symptoms in the first patient indicated a compressing, cerebral abscess, and on account of the sensitiveness of the left mastoid process in connection with a preceding otitis, left little doubt of the otitic origin of the intracranial complication. As evidences of the compression within the skull, were slow pulse and a congested retina, while motor weakness, headache, hyperesthesia of the right side, vomiting, vertigo, numbness and slight elevation of temperature indicated an abscess of the temporal lobe, although there was no aphasia. The absence of stiffness of the nucha and high fever with a regular pulse, were against the presence of meningitis. The operation, however, showed the absence of pus, but the excessive amount of serous fluid found when the brain was exposed indicated a pathologic increase. The dura presented a degree of firmness quite un-

usual and it was then considered that the affection was evidently a beginning suppurative meningitis in the stage of hyperemia and serous effusion. The chronic character of the process was shown by the long continued headache preceeding surgical intervention, while the disturbance in gait and equilibrium still persisted, showing that permanent lesions had been induced. In the second case the diagnosis remained in doubt for several weeks after the operation, but gradually the threatening symptoms induced by the compression ameliorated, the serous effusion diminished and the case recovered without further incident.

The location of the original focus of infection in the mastoid or its immediate vicinity will determine to a great extent the initial focus of meningeal infection. It may, however, affect the entire surface when a basilar meningitis is apparently the form of predilection, or the infection may remain localized with resultant discrete abscess and as the course of the extradural abscess is very slow, adhesions form between the dura mater pia, mater and brain, and act as a barrier to the development of a purulent leptomeningitis. While the abscess so formed may remain quiescent for a lengthy period, further infection from this focus may ensue and a purulent leptomeningitis will follow, such a case being reported by Barkan. Secondary inflammation of the meninges, however, varies in intensity and extent in different cases, depending upon the quantity and quality of the infective elements and the power of resistance of the individual tissues. In some a profuse plastic lymph may be thrown out and the inflammation thereby will be limited in extent, while in others no such means of protection are afforded and a diffuse purulent meningitis results, so extensive as to sometimes involve the cord for a considerable extent. Two locations, however, are commonly the seat of choice, the temporo sphenoidal lobe and the cerebellum, the particular direction in which the infection takes place depending in a measure upon the anatomical peculiarities of the individual case.

The precise mode of the extension of the infection is subject to great variations, but in a general way it takes place either by direct continuity or indirectly by the way of the blood or lymph channels. By direct infection from the mas-

toid caries of its inner wall may lead to sinus phlebitis, which in turn may give rise to a septi meningitis. Though the path of infection may be sometimes obscure, it is usually more or less direct, as the area of meningitis is almost invariably on the same side as that of the mastoid empyema. Septic phlebitis of the venous radicles leading from the mastoid is also probably one of the commonest methods by which the septic material is conveyed to the meninges, this route being aided in a considerable degree by the free inoculation of the small vessels of the ear and dura; in this way the infection may be carried through apparently healthy bones.

The dura of the posterior fossa may especially become involved by direct carious processes of the mastoid, or by necrosis, erosion or atrophy, the last form being seen in cholesteatomata. The extension of mastoid disease to the membranes of this region depends to a great extent on the arrangement of the system of pneumatic cells, and as the cells are lined with epithelium they permit the suppurating process to go on rapidly, and if it extends as far as the inner table, the infection spreads more rapidly to the meninges than if it were separated from the brain membrane by a compact layer of bone. The relation of the route of the infection to the arrangement and number of the pneumatic cells also varies in the child and the adult, and as a result of the anatomical structure of the mastoid in early infancy; inasmuch as it possesses but few cells, while the posterior wall is strongly developed, it renders disease of this region in the infant less apt to invade the meninges of the posterior fossa than is the condition in adults. Another factor which however is not of as much importance in regard to the mastoid region as in that of the tympanic cavity, is the presence of occasional clefts or fissures in the bone, the presence of such apertures of necessity bringing the diseased process of the mastoid in direct relation and close approximation to the dura.

When a purulent leptomeningitis develops, the pathogenic substance is carried into the arachnoid in various ways, either by perforating the dura or by means of minute channels which leave no macroscopic evidence. The original area of

infection usually develops in the immediate vicinity of the diseased dura and travels from the base of the brain to the convexity of the same side and also across the base to the convexity of the other side if the process be extensive. The pus is found in the furrows between the convolutions and also in disseminated patches, while the pia mater is hyperemic and edematous. The extreme difficulty of tracing the paths of infection from the ear to the meninges may be sometimes unsurmountable, a valuable case in this connection being reported by Wilson, of leptomeningitis of otitic origin, the mastoid contained a deep seated cavity filled with pus, but no granulations nor softened bone. The symptoms then improved for a day, but rapidly grew worse and the patient died comatose. The autopsy showed a large area of leptomeningitis over the base of the brain and the whole right lobe of the cerebellum, which also contained a small abscess. The dura over the upper surface of the temporal bone was healthy except at the junction of the petrous ridge with the squamous portion, where there was a foramen leading through the ridge from the posterior to the middle fossa and filled with pus.

The nature of the microorganisms present in the mastoid empyema play some part in the virulency of the meningeal inflammation and a reduction of the virulency of the specific microorganism present in a given case, effects the occurrence of a circumscribed meningitis, which, of course, is the preliminary condition of nearly all brain abscesses. If on the other hand the bacteria be of a virulent character and if they reach the inner surface of the dura, the inflammation rapidly spreads and a diffuse leptomeningitis is the result. For these reasons a brain abscess is rarely found with acute mastoid empyema and with the bacteria attenuated; infection of the brain substance from the circumscribed meningitis rarely occurs and the patch of meningeal inflammation may exist independently for a long time. Various organisms may be found in the meningeal exudate but the staphylo- and streptococcus are by far the most important. Kirchner reports a case of purulent meningitis with the staphylococcus as the only organism present, while in Hamilton's case of mastoiditis with the pia and arachnoid at the base congested and in-

filtrated with thick, yellow pus, both cultures of the blood and pus gave pure colonies of the streptococcus pyogenes.

As illustrating the formation of an extradural abscess from a localized infective meningitis, which originated from a mastoid empyema, the following case well shows the consequence of events and the favorable results obtained by early operation.

C. M. male, age 35 years, had always been in good health until two years ago, when, following a severe attack of influenza, severe pain developed in the left ear and continued for several days, when it gradually diminished in intensity and finally disappeared. This occurred several times within the two years since the primary attack, but as it disappeared spontaneously nothing was done for it. One week before he came under my observation, the pain had again commenced and instead of ameliorating was gradually increasing in intensity, so that he was forced by its violence to seek relief. No discharge had been noticed at any time and when the ear was examined the canal was perfectly dry, but exceedingly red and inflamed, especially along the posterior wall, while the tympanic membrane was violently inflamed and was pushed forward, as if the tympanum contained fluid. The posterior and superior wall in part, projected into the lumen of the canal and all the parts were exquisitely tender. The auricle was pushed forward and the mastoid was swollen and tender. The temperature was 100 degrees F., while the bowels were constipated. Immediate operation was advised and accepted and after the usual preparation of the patient, the mastoid was opened and was found filled with an offensive pus, while there was extensive destruction of bone tissue. But little pus was found in the region of the tip of the mastoid, the greater part of it being in the cells in immediate relation to the antrum. The pus and necrosed bone of the mastoid and antrum were thoroughly removed and free communication established through the tympanum and external canal by the above means. The tympanic cavity was found full of purulent material. Marked relief to the symptoms was obtained and he progressed through the usual course for two weeks, with the mastoid wound healing nicely, when he again complained of pain in the former situation and also located a

painful area extending still further back than the mastoid tenderness. Within a few hours he became slightly delirious, food was vomited, his mental condition was sluggish and he complained of severe pain in the occipital region. The temperature was 104 degree and the pulse 120. No other symptoms that would in any way aid in clearing up the condition, could be ascertained. The original mastoid wound was then enlarged backward and the brain cavity was opened, the dura immediately projecting outward as a red, granulating, non-pulsating mass. Free incision was made into it, when about three drams of pus was evacuated and an abscess cavity was found walled in by masses of plastic lymph, although the meninges were beginning to become inflamed in all directions as far as could be seen. The pus was thoroughly washed out, the granulations removed and the usual dressings applied. The pain immediately ceased and no further trouble was experienced as the patient made an uneventful recovery. No route by way of which the infection traveled could be ascertained.

A somewhat similar case to this is recorded by Buck, of a man of 57 years, of strong constitution, who had during a period of ten years, five distinct attacks of acute otitis from all of which he apparently made a good recovery. The present attack had lasted for seven weeks, with headache and dullness of hearing but no discharge. The posterior wall of the canal was swollen, the membrana tympani was injected and the mastoid was tender on pressure. The drum membrane was incised but no pus escaped, and he experienced relief for about a week, when the pain returned and the mastoid became swollen. An incision was made through the mastoid periosteum and some relief was obtained, further operation being refused by the patient. The following day he became conscious, pupils were non-responsive, face flushed, head hot, pulse 120 and full, while the breathing became stertorous and death occurred the same night. The autopsy showed a purulent basilar meningitis and a free communication between the mastoid antrum and the cavity of the sigmoid sinus, the two forming an irregular cavity filled with pus.

When a mastoid empyema is about to infect the meninges,

there is almost invariably marked local pain, usually associated with fever. When such a condition occurs especially in the presence of a diminishing aural discharge, the patient should be considered in serious danger of cerebral complications.

Headache is probably the earliest and most pronounced of the meningeal symptoms and while at first it may be more or less localized to the temporal or occipital regions of the affected side, it later becomes generalized; even though the patch of meningitis remains localized, the headache may in some cases be intense and general throughout the whole course of the disease. Dizziness, auditory and visual hyperesthesia, mental weakness, delirium and convulsions are also seen, but are subject to considerable modification by other existing complications such as abscess with high temperature and slow pulse, or sinus phlebitis of a septic form accompanied with rapid diurnal changes of temperature. Usually the temperature is high and remains constant with but few fluctuations, but it may vary from 101 to 105 degrees. Photophobia, vomiting and local or generalized convulsions may also indicate meningeal involvement, while in children general convulsive symptoms are common owing to the high grade of fever usually present from the onset of the meningeal irritation.

The respiratory changes may come on quite early and while in ordinary meningitis breathing is rapid and irregular, with the pulse small and frequent, in the basilar type Cheyne-Stokes respiration is frequently noticed, especially when the posterior cranial fossa has been complicated. The younger the patient the earlier delirium appears, but it is not necessarily characteristic of this form of meningitis, as it may not occur until toward the fatal termination of the case, and is present in any of the forms of the intracranial complications, although if it should appear early, it may be of value in indicating a complicating meningitis, but only in connection with other symptoms. In other instances it will be absent during the entire course of the disease, the patient slowly passing into a condition of coma and death. The ocular phenomena in basilar meningitis also present some points of import in this connection, although the optic discs are usually normal

as it takes a week for the development of neuritis when the disease is limited to the posterior fossa, yet the third, fourth and sixth nerves are sometimes involved. Most important in this connection is the involvement of the third nerve, producing at first contraction of the pupil and later dilatation. An early symptom of paralysis also is the failure of the pupil to respond to light, sometimes remaining widely dilated even when exposed to the most intense illumination. Another symptom of the same class of which cognizance should be taken, is the development of strabismus from the involvement of the nerves previously mentioned.

Constipation as a rule is often obstinate and especially so toward the end of fatal cases, while if diarrhea be present or the bowels be normal, brain abscess and meningitis may with a certain degree of assurance be eliminated. Occasionally in rare cases, paradoxical symptoms may be present, as slow pulse, aphasia, agraphia, impairment of memory and progressive emaciation. These cases, however, are of a very chronic type and the exact intracranial lesion may only be determined when the cases come to autopsy. In adults, of course, it is possible to differentiate the symptoms of the intracranial complication from that of the mastoiditis, but in children such is not always the case and a meningitis may be fairly well under way before more prominent symptoms become evident.

The pathological changes taking place in the dura vary in their rapidity with the extent of the primary infection and from at first being slightly reddened and dull in appearance, the membrane will pass through the successive degrees of vascularity until it becomes thickened and studded with granulation tissue. In the chronic cases dependent upon a circumscribed area of necrosis or caries of the underlying mastoid process, it becomes black in color like the bone, softened and gangrenous, while the parts are bathed in serum or pus and may later perforate, producing a diffuse leptomeningitis. Where the destruction of the osseous tissue is accompanied with considerable pus formation, the dura is separated from the bone by a collection of purulent debris varying in color from the creamy pus of the acute cases to

the thin, discolored material in the more chronic forms. As pointed out by Zaufal in the very chronic cases, the dura may be enormously thickened and present a fibrous or sarcomatous appearance—in one case coming under his observation the dura being $1\frac{1}{2}$ cm. thick.

The late development of basilar meningitis following a previously localized area surrounding a temporo-sphenoidal abscess was well illustrated in the following case:

R. L., female, 18 years of age, had measles in infancy followed by a suppurating ear for several years. The discharge then ceased for a time, but would make its appearance in small amounts whenever she had an attack of coryza.

Four months before she came under my observation the impairment of hearing became markedly worse, and a scant foul discharge was constantly annoying by keeping the canal moist. A few weeks later pain began to develop in the aural region, but she stated that she could never definitely localize it with any degree of accuracy, but the slightest movement of the head and body would immediately render it much more intense. On examination, she was in an apathetic state and cerebation appeared to be very sluggish. There was sensory and motor aphasia, marked drooping of the eyelid and the left pupil was dilated, evidences of optic neuritis on this side being well marked. There was a large perforation of the membrane surrounding the umbo and a smaller one in the flaccid membrane. The temperature was 98.2 degrees, while the pulse was but 64.

Under ether anesthesia the radical mastoid operation was performed, and great quantities of blackened necrosed bone and foul pus was removed from the region of the antrum and inner wall. The cortex of the mastoid showing a condition of compactness almost approaching eburnation, and was removed to reach the softened areas with the greatest difficulty. As evidences of cerebral abscess were more prominent even than the mastoid symptoms, an independent trephine opening was made in the skull over the temporo-sphenoidal lobe and the dura immediately presented as in the previous case as a red, non-pulsating mass. An opening was then made in the inflamed membrane and after considerable difficulty about one-half ounce of pus was evacuated. Considerable improve-

ment was evident in her condition for twenty-four hours when the temperature ran up to 105 degrees, the pulse erratic and bounding, varying from 70 to 120, while intense pain was complained of over the entire head, but especially on the left side, where all the trouble had been. The symptoms of purulent meningitis rapidly increased and she died in coma two days after the operation. An autopsy was refused.

Thereports of the serious intracranial complications of mastoiditis render an early diagnosis of the pathological process present in a given case of supreme importance, and the differentiation of any symptoms indicating a beginning meningitis, must, of necessity, be made early in the disease to allow the patient the greatest benefit from operative treatment. The chief symptoms of meningeal irritation are headache, occasional nausea, vomiting, vertigo, moderate increase of temperature and some acceleration of the pulse rate, while thirst, anorexia and constipation are mostly complained of, but are not characteristic. Percussion of the skull affords but little evidence as it may be either painless or painful above and behind the auricle. The differentiation between meningeal irritation and true meningitis in my experience is almost impossible, although the latter may be recognized when the headache become persistent and is followed by the group of symptoms above mentioned, with, in addition drowsiness, delirium and stupor, while the pulse is at first accelerated, and later becomes retarded.

The confusion of the symptom-complex may also be greatly enhanced by the primary stages of the meningitis being due to congestion and edema of the surrounding parts.

An interesting case is reported by Knapp of aural sup-puration with headache, nausea, dizziness and some stupor. Later the mastoid became swollen and tender and an opening an inch deep was made, but no pus was found. Four days later free suppuration occurred both from the opening and the canal and temporary relief was obtained. The grave symptoms however returned, with a rise of temperature to 105 degrees and death occurred. The necropsy showed a purulent leptomeningitis of the left temporal lobe and lateral ventricle, while pus was on the inner side of the

mastoid, in the attic and especially around the foramen lacerum.

The great difficulty in recognizing the condition is also graphically shown by another case of the same authors of an apparently strong, healthy man, with purulent otitis for three years. The discharge had ceased for one week and there had ensued headache, increase of temperature, drowsiness, stupor, movements of hands, incoherent and difficult speech and delirium. One physician made the diagnosis of a partial meningitis, while three others considered the condition as one of otitic cerebral abscess. The mastoid was sclerosed and under the cortex the osseous tissue was blackened in patches and contained a few small cavities filled with thin pus. More deeply, the bone appeared healthy, hard and ivory like and free from caries or necrosis, and gave no clue to the way by which the infection had entered the cranial cavity. The patient died three days later and the autopsy disclosed an extensive tuberculosis of the lungs, pleura and pericardium, and a tubercular meningitis which had no connection with the ear.

The difficulty of diagnosis is also enhanced when the otitic meningitis occurs in a tubercular, nephritic or diabetic individual, and a careful survey of the past and present history of the case may even then fail to establish the identity of the affection. As an operation would be more successful if the diagnosis was successfully made before opening the cranial cavity, an exploratory operation may in selected cases be advisable, but usually it is often useless and sometimes it may be dangerous, as it may hasten the unfavorable termination of pre-existing lesions, or even induce the formation of new ones.

Aside from the localizing symptoms, which are of great value when present, the chief symptoms indicating an intracranial lesion have already been mentioned, and the comparative worth of the different symptoms is of great value in determining the presence or absence of meningitis. Optic neuritis is a symptom of great value, but is less frequent in meningitis than in brain abscess. Headache is very intense in leptomeningitis, although it may be absent in some cases. Slowness of the pulse may be an important symptom of in-

ipient meningitis, but unfortunately it is often not characteristic. Rigidity of the nucha is seen in many conditions and depends upon diverse causes, so that it is not characteristic of meningitis, although in connection with other symptoms I consider the rigidity of this region as of considerable diagnostic import. Vertigo and nausea may exist in any of the intracranial complications of mastoid empyema, while fever when high and persistent is strongly indicative of a purulent leptomeningitis, although Allport reports a case of influenza followed by mastoiditis, sinus thrombosis, meningitis and death in which as a most remarkable feature, was the continued presence of a subnormal temperature. The Patellar and other reflexes afford little aid, although they are generally absent in meningitis.

The most reliable group of symptoms characteristic of meningitis in adults are, in connection with the preceding history, constant high temperature, headache and vomiting. But at the same time any intercurrent acute affection must be excluded, and the diagnosis is of necessity rendered much more difficult in children, since any acute affection and even an attack of gastro-enteritis may for a time produce symptoms very similar to those of meningitis.

Finally, lumbar puncture may in case of doubt, afford much valuable information. Grunert in two cases obtained positive results in suppurating leptomeningitis of otitic origin, while Gradenigo used the method in two cases with brilliant results, and as under aseptic precautions Quincke's method offers no especial dangers to the patient, it may in certain cases be the only way left to ascertain the presence or absence of pus in the cranial cavity.

It is necessary in this connection, however, to constantly bear in mind in these cases that it is rare to have but one complication, as two, or even three, viz., abscess, meningitis and sinus phlebitis, may all be present in a fatal case, the exact condition not being actually known until an autopsy is made, but even when such is the case a careful study will enable one, in a limited range, to distinguish the most prominent affection. Such a case is reported by Knapp, in which necropsy showed mastoid empyema, perforation of the lower mastoid wall and extension of the pus down the neck, with

epidural abscesses in the middle and posterior cranial fossa, septic thrombosis of all the sinuses, of both internal jugular and most of the cerebral veins, with in addition an abscess in the temporo-sphenoidal lobe and cerebellum and diffuse purulent meningitis.

With a better appreciation of the relative value of the symptoms and a constantly improving surgical technique, the prognosis of meningitis following mastoid empyema affords considerable hope, especially as favorable results have followed prompt diagnosis and early surgical relief. Macewen having reported six recoveries in itself proves that a lethal issue does not always ensue. In the majority of instances, however, secondary purulent meningitis is rapidly fatal, especially so in patients under ten years of age, so that as a rule it may safely be said that the younger the patient the more likelihood there is of a fatal termination.

In the early stages of meningitis, and but for a short time only, ice caps to the head and large doses of bromids to lessen irritability of the nerve centers may be tried in addition to free purgation; but these measures are of little value and the only hope as regards success lies in the early institution of surgical measures. The earlier the operation is performed the greater the chances of success, and as the disease is invariably fatal if not checked by operation, we should not hesitate to interfere, even in apparently hopeless cases.

It is unnecessary here to describe in detail the various steps of the operative procedures, but the principles indicated are to thoroughly perform the radical mastoid operation taking especial care to discover the site of any perforations into the cranial cavity. If such are found they should be enlarged and the brain cavity freely explored, but if, however, no sinus is found or no area of necrosis suggestive of the site of the meningitis, the roof of the tympanum should next be explored by entering the cranial cavity above the meatus. The inner table may also require removal in the area of the mastoid wound and any focus of meningeal inflammation or pus cavity should be thoroughly cleansed, the parts packed and the usual dressings applied.

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XXV.

SOME UNUSUAL MASTOID CASES.

BY H. BERT. ELLIS, M. D.

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Dr. George H. Powers, of San Francisco, on April 22nd of this year, reported the following case. On Sept. 14th, 1902, Mrs. D. Y. entered hospital, with vague account of a severe disease of left ear from which she had recovered. Patient was nearly unconscious, entirely irrational, lying on her back with head turned a little to right; she shrank from candle held near her eyes and from speculum inserted into left ear, otherwise she was neither sensitive nor intelligent. Pupils were dilated but reacting to light; there was no strabismus and no change of fundi. Tendency to opisthotonos existed with abdominal muscles tense. These conditions continued till full consciousness three weeks later. There was neither swelling nor tenderness over the mastoid, but slight sensitiveness in the left auditory meatus; the walls were sufficiently swollen to render a satisfactory examination of the drumhead impossible. There was no indication of purulent or other discharge, but a fairly free incision of the membrane was followed by small hemorrhage and a few drops of pus. Following the incision, the patient became very talkative, but was incoherent and unable to answer questions intelligently and chattered continuously. This condition of alternate comatose and lively irrational conditions lasted two weeks, much of which time the patient was kept in bed with difficulty, although tied down. Sept. 17th, lumbar puncture was made and pneumococci found, and these were also found in the ear secretions. Sept. 28th, opened up the mastoid antrum and cells down to tip. No pus was found, only granular and polypoid detritus. No further communication with the middle ear was made. Patient was worse for

a few days, but in a week she was quite conscious and rational and went on to an uninterrupted recovery, with perfect hearing. Highest temperature 101° , pulse 110, leucocytes 5200-7000. This case is remarkable for the amount of mental derangement as compared with the small local disturbance.

Miss B. M. E., a woman of 48 years, was referred to me Aug. 8th, 1902, on account of a facial paralysis, which had come on suddenly a week previously. It was right-sided, and was accompanied and preceded by considerable excruciating pain in the right ear and mastoid region, this pain running down to the neck. There was very marked tenderness, on deep pressure, over the mastoid antrum, but no sign or history of previous middle ear trouble. I opened and thoroughly curetted the mastoid antrum and cells. There was no inflammatory condition whatever present in them, and no pus or other detritus in the antrum, but on entering the antrum many bubbles of air forced themselves through the blood with an audible puff. The cavity was allowed to fill with blood and wound closed with sutures, and healing was by first intention. Five days after the operation, the patient's temperature went up two degrees, the first time there had been any rise; this, after a few hours of anxiety, I found to be the result of an acute suppurative otitis of the opposite ear, and under local treatment both discharge and temperature disappeared in a few days. The facial paralysis began to improve the second day after the operation, and in sixteen days the patient returned to her home without a facial paralysis. With the symptoms present, was the antrectomy justifiable?

Wing Jo, a Chinese infant of seven months, was fretful for two or three days during a period when teeth were appearing. The fretfulness was attributed to this fact, but on the morning of Dec. 26th the child's father noticed a swelling behind the little one's right ear. A colleague saw the case and ordered the patient to the hospital for operation that afternoon, at which time the right ear stood out from the head in a typical manner and a slight discharge was found in external auditory canal. The tenderness was marked, the temperature 102.8° and pulse over 140. On opening the soft tis-

sues a large quantity of pus was evacuated and extensive necrosis of the mastoid portion of the temporal bone was found. This was completely removed and the wound packed with sterile gauze. As a result of the operation, the pulse was considerably accelerated and the temperature was by no means diminished for 48 hours, when it dropped to 99.4° , with a pulse of 120. After this, however, there was no further trouble. In this case considerable pus was found in the antrum, but the peculiar features were the rapid onset without history of previous middle ear involvement, although it evidently existed; and the extensive bone destruction.

Tony Larsen, a girl four years of age, had scarlet fever early in December, 1902. During the progress of the disease, before desquamation was complete, she had a double suppurative otitis media. On Dec. 29th, I was called in consultation to see her, found a temperature of 104° , pulse 140 and higher, both ears discharging freely, drooping of the superior posterior walls of external auditory canals, tenderness marked over the mastoid antrums, but very little swelling or discoloration externally excepting that probably due to scarlet fever. Streptococci were present in the discharge. The following day the temperature was 104.8° , pulse 150 to 160, heart very weak and tenderness over mastoids more marked. I did double antrectomy, and was forced to operate very rapidly on account of the exceedingly weak condition of the heart, and also because the operation was performed in the country in the late afternoon in an incompleated room of an unfinished house. In my haste I opened the middle fossa of the skull to a small extent. Found abundant pus in each antrum, scraped out all diseased bone I could find and packed wound with gauze. Although only 55 minutes were occupied in the complete double operation, and less than an ounce of ether was administered, the heart action was so feeble (it being impossible to find pulse in wrist) that I did not expect to find the child alive the next day. Much to my surprise, however, the temperature dropped to 102° , and the heart's action and general condition were much better, and the history of the case to perfect recovery was almost without interruption. Three weeks after the operation, when the temperature had been normal for three days, it suddenly

ran up again to 102° , due to suppuration of a lymphatic gland of the neck. This quickly subsided on drainage. Double mastoid operations are not common, and it is rather unusual, when vitality is so impaired and albumen abundant in the urine and when the operation is performed under conditions when only an effort at asepsis can be made, and in a room without windows or doors, it is unusual, I repeat, even to expect a recovery.

Mrs. K. L. T., aged 30, was referred to me for operation because of an acute facial paralysis of the right side. The paralysis was marked and had come on suddenly in an apparently healthy patient, less than two weeks previously; but I received the information that for something like two years she had been quite deaf in the right ear, she was able to hear the watch only on contact. She had no rise of temperature or suppuration of the middle ear, but had quite marked tenderness over the mastoid antrum. I could not obtain her consent to a radical operation, but she was more than willing I should do an antrectomy, which I accordingly did Jan. 14th, 1903. I found the whole mastoid process pneumatic, the cells and antrum all being absolutely dry and apparently healthy. I converted them into one cavity, cleaned and closed, removed stitches on the sixth day. In two weeks the paralysis had entirely disappeared, there had been perfect union, and at no time after the operation did the temperature go above 99.2° . I kept the patient under observation at the hospital for a third week, when I discharged her. Up to the present date there has been no return of the paralysis. Was there any relationship between the operation and the cessation of the paralysis? I am not at all convinced of it myself, but had I done a radical operation and obtained the same results I should probably have had very decided opinions in the matter.

On Dec. 5, 1902, I was called to see M. S., boy 11 years of age, recovering from typhoid fever, who had been sick eight weeks. On account of discharge from and pain in the right ear, I was called in consultation. The pain had not been severe, nor the discharge profuse, but neither had improved in two or three days treatment. I found a small perforation in inferior posterior quadrant of drumhead, no marked dis-

turbance of Shrapnell's membrane, slight tenderness and swelling over mastoid antrum and at tip of mastoid. Temperature had run up to 102° , although the high point of the curve in the typhoid history had been down below 100° for several days. In two days the middle ear discharge, under boric acid irrigation had ceased and the temperature had dropped to 99° , pain had ceased and patient was feeling very well. On the 12th, bulging began behind the auricle, the patient was more uneasy, tenderness somewhat increased, but pain was not a symptom. On the 13th, the swelling being pronounced, I operated. As soon as I cut down to the bone, I had a large gush of pus. On the use of the probe, I found a necrotic spot at the superior anterior margin of the external auditory canal, which I carefully curetted away before the operation was completed, but not until after I had opened up the antrum and found it healthy. The boy made an uninterrupted recovery. Here we have a case of acute suppurative otitis media, mild in character, acute mastoid periostitis with necrosis and yet no involvement of the antrum or cells.

On Feb. 8, 1903, I was called in by our fellow Dr. E. W. Fleming to consult on the following case: G. S. C., 32 years old, had tubercular consolidation both apices since 1891, associated with elevated temperature, rapid pulse, loss of weight and irritable cough.

Feb. 13, 1902, left ear began to discharge pus without previous history of pain or other disturbance save impaired hearing. June 26, 1902, patient sustained a sudden attack of incomplete paralysis, involving the left side of the face, shoulder and arm, also the tongue.

The paresis lasted but a few minutes; July 26th, experienced a similar attack, but quickly recovered. In the interval between these two attacks and following the second, he frequently articulated with difficulty. Was decidedly inclined to be petulant and irritable, forgetful, and in reading had difficulty in keeping his mind to the text. Dec. 9, 1902, considerable middle ear pain, bulging of the membrana tympani. Moderate swelling over mastoid, with some tenderness on pressure. Until this time drainage good and freedom from pain. Examination of pus discharge for tubercle

bacilli negative. Symptoms all subsided, following free incision of the tympanic membrane, ice and hot irrigating. Feb. 1, 1903, recurrence of pain in middle ear and diminished discharge. Bulging of tympanic membrane and some sagging of upper posterior wall. No swelling over mastoid or marked tenderness on pressure. Temperature from 100° to 103° . Free incision of the drum membrane was followed by vertigo and vomiting, which lasted several days. On consultation as the patient was getting low and the suppurative otitis seemed to be an important factor in his sudden decline, with the consent of the family a radical operation was decided upon and the same was performed Feb. 9, 1903. During the operation the assistant (the writer of this paper) in probing for the antrum opened the lateral sinus, but the hemorrhage was readily controlled and the radical operation completed. Only degenerated mucous membrane was found in the antrum. Opening the cranial cavity was contemplated but the extreme lowered vital condition of the patient rendered further interference exceedingly unwise. The patient died within twelve hours.

Post-mortem—Left leptomeningitis embracing temporal, sphenoidal and frontal lobes. Adhesions of dura-mater along sinus longitudinalis. Right meningeal thickening involving frontal, parietal and temporo-sphenoidal lobes, evidently of more recent origin.

Brain Section—Pus in cysterna magna. Ventriculi free from pus, on cross sections no pus in brain substance. Extensive necrosis of pars petrosa ossis temporalis. Diagnosis—Meningitis purulenta.

The only wonder in our minds after the post-mortem was how the patient was able to live as long as he had.

243-246 Bradbury Block.

XXVI.

THROMBUS OF THE SIGMOID SINUS—REPORT OF
TWO CASES, PRESENTING SOME SYMPTOMS
DIFFERING FROM THOSE USUALLY
FOUND IN THIS DISEASE.*

BY JAMES F. MCKERNON, M. D.,

AURAL SURGEON TO THE NEW YORK EYE AND EAR INFIRMARY.

The otological literature of the past five years has contained reports of so many successful cases of sigmoid sinus thrombosis that it may at first seem almost superfluous to bring this subject to your attention; but in the cases I am about to report some of the symptoms as found presented were a departure from those given us by many observers, and it is to speak of and emphasize these in particular, that I wish to report these cases in detail.

CASE I gave the following history: L. C., a girl 16 years of age, was admitted to my service at the hospital May 6, 1902. Ten days before she had complained of pain in the right ear, with dizziness and buzzing on that side of the head. She had never had any previous ear trouble.

On admission, her temperature 100.2 F., pulse was 86, respirations 22. Physical examination disclosed on the right side a swollen and darkened drum membrane, bulging over the whole of the posterior quadrant, with a slight prolapse of the posterior-superior canal wall. There was slight tenderness upon pressure over the mastoid antrum, but none over the tip; there was no nausea or vomiting, and only a slight headache.

An incision was made in the drum membrane, and this was followed by a discharge of a thick pus, which was examined and found to contain streptococci in abundance,

*Read at the Thirty-sixth Annual Meeting of the American Otological Society, held at Washington, D. C., May 13, 1903.

together with a few diplococci and pneumococci. The patient was placed in bed, fluid diet and free purgation for the bowels were ordered; and the ear was syringed every two hours with a 1-4000 solution of bichloride of mercury.

The following morning her temperature was 99 F., and she was feeling very comfortable; the middle ear was draining freely, and there was practically no tenderness over the mastoid. This comfortable condition remained for two days, and was then followed by a severe pain in the ear and in the mastoid of the same side.

Tenderness upon pressure over the mastoid antrum was increased, and there was also a further prolapse of the posterior superior canal wall. The temperature was still 99 F.

Owing to the increased pain, tenderness and prolapse of the canal walls, it was decided to open the mastoid; the typical mastoid operation was done, the antrum and cells were found filled with greenish pus, which, upon examination, was found to contain large numbers of the streptococci. The sinus was not exposed, and the patient was returned to the ward in good condition.

The following morning she was very comfortable, the temperature was 98.8 F., pulse 78, and respiration 20. At 3 P. M. of the same day, the patient asked to have a window some distance from her bed closed, saying she felt a little cold; her temperature was at once taken. Although it had been recorded but two hours previously as 99 F., it was now found to be 105.6 F., pulse 146 and respirations 28. In about an hour she complained of nausea, but there was no vomiting.

She still complained of feeling cold, but no chill was present. A special nurse was detailed to care for the case, with instructions to take the temperature every two hours and watch carefully for any evidence of a chill. For the next twenty-four hours, the temperature, taken every two hours, registered at no time higher than 105.8 F., its lowest point being 105.2 F. The chilly sensation continued, and the girl became dull and sleepy; the eyes were examined and found to be negative.

This condition continued throughout the afternoon and night.

The next morning her unchanged condition and continued chilly sensation made me suspect sinus involvement; and at noon of that day she was again taken to the operating room and the sinus exposed from an inch above the knee to the bulb. The dura covering the sinus was almost black in color, and the sinus wall between the knee and the bulb was collapsed. The anterior wall of the sinus was incised at the knee with a scalpel for half an inch, and a small amount of straw colored serum escaped; a curette was passed upward, and a clot about half an inch in length was removed.

This clot was firmly adherent to the anterior and inferior wall of the sinus, and was of a yellowish brown color.

Upon its removal, a free hemorrhage followed from the torcular end of the sinus, which was controlled with iodoform packing. Continuing the incision in the sinus wall downward to the bulb, a portion of the lumen of the vessel was found empty for nearly an inch. Below this point, pus, with a reddish, grumous material was found; this was removed and the curette used freely at the bulb.

Upon wiping away the débris each time after using the curette, a few drops of grayish pus would make their appearance, coming apparently through the bulb from the internal jugular vein. Owing to this condition being present, and to the fact that there was no return hemorrhage from either the vein or petrosal sinuses, it was decided to expose, ligate and resect the internal jugular vein, so as to prevent the possibility of any further systemic infection taking place through the vein on that side. This was done, as was also a portion of the internal maxillary and facial veins, ligated and resected, as, upon exposure, they were found to be involved. There were also four infected glands removed during the course of the dissection.

The ligature used on the jugular vein was heavy silk, and on the tributaries chromicized gut. The field of operation was cleansed with a hot saline solution, and a continuous silk suture used to close the wound in the neck.

Immediately following the operation, a quart of hot saline solution was introduced into the bowel, and this was all that was necessary in the way of stimulation.

For the next two days, the temperature did not drop below

104 F., and the lowest pulse rate was 144. There was considerable twitching of the right side of the face and mouth, and she was exceedingly restless, but perfectly conscious, complaining only of pain in the head and wound.

On the third day following the operation the temperature dropped to 102.6 F; pulse, 128, and there was less head pain.

For the next six days, making nine days from the time of operation, there was a gradual improvement in her general condition, with a slight lowering of the temperature each day, until on the tenth day it reached normal, where it remained.

The neck wound healed by primary union, and the girl was discharged from the ward service three weeks after the operation, to return every third day for dressing until the mastoid wound was closed. The resected jugular as well as that portion of the tributaries removed, were sent to the laboratory for examination, and the pathologist reported the finding of a broken down clot with pus present. Large numbers of streptococci were found in the material contained in the veins. The glands removed also contained the same characteristic infection.

CASE II. E. L., a girl 6 years of age, was first seen on June 2, 1902. The history given by her mother was that she had been taken ill six days previously with pain in the right ear followed in twenty-four hours by a bloody discharge, this discharge lasting three days.

The child had never had any ear trouble before, and otherwise had always been in good health.

Upon inspecting the ears, a scanty purulent discharge was found in the external auditory meatus of the right side; the canal walls were inflamed, and there was a large ragged perforation in the lower anterior portion of the drum membrane over the tympanic orifice of the Eustachian tube. There was no sagging of the canal wall, and only a slight amount of tenderness on pressure over the mastoid antrum. A culture was taken from the discharge found in the canal, and contained large numbers of streptococci. There were also a few diplococci and staphylococci present.

The temperature was 99.2 F., pulse 94. The child was

placed in bed, and the canal irrigated with a solution of bichloride, 1-6000 every two hours.

The little patient slept some at intervals during the night, but complained toward morning of not having sufficient covering over her. When seen the day after her admission, the temperature was 99.6 F., pulse 100. At intervals during the day she complained of feeling cold.

The bowels were moved freely, and she was kept on a fluid diet, and the temperature taken every three hours. The discharge from the canal increased somewhat, but the mastoid tenderness remained about the same.

The child continued practically in this condition for five days, the temperature never rising above 99.8 F., and she complained each day of feeling cold. On the sixth day there was a tendency to sagging of the posterior superior canal wall, and the discharge had diminished considerably. The tenderness over the mastoid was about the same as on the days previous, but the child was beginning to look septic, and the breath was very offensive. The tongue was dry, heavily coated, and of a dark grayish color.

Believing we had a condition, the cardinal symptoms of which, for some unknown cause, were masked, an operation was decided upon. The usual mastoid operation was done; there was only a small amount of pus found in the antrum and at the tip, but the whole osseous structure was infiltrated and softened, and nearly all the inner table was removed. The sinus was very close to the posterior canal wall and was exposed below the knee; the dura covering it was distinctly greenish in color, and seemed more prominent than one usually found in a patient as young as this one. A further exposure was made both above and below the knee, and at these points the dura was greenish in color also. The anterior sinus wall at the knee was opened with a scalpel for about half an inch, and immediately about a teaspoonful of thick, grumous material began to ooze through the slit made in the wall; it was of a reddish brown color, of about the consistency of thick cream, and incorporated with it were particles of pus.

A dull curette was used above, and more of the same material removed and free hemorrhage established. The lower

portion of the sinus toward the bulb was now curetted, and, after the removal of more of this reddish brown material, the character of the substance began to change and assume more nearly the character of dark colored pus.

The bulb was now curetted without any flow of blood taking place. The sides of the sinus wall were separated and the lumen of the vessel in the region of the bulb was wiped clear of pus and debris, and when this was done the same dark colored pus was seen coming up through the bulb.

Believing we had here to deal with an infected vein as well as a sinus, the neck was prepared and the internal jugular vein was exposed, ligated below at the clavicle and above at the bulb and resected.

The tributaries did not show any evidence of infection, so they were ligated and left in position. Neither was there any glandular involvement. The wound was closed by a continuous suture to within an inch of the bulb, and healed by primary union throughout. The resected vein for $2\frac{1}{2}$ inches below the bulb contained a soft substance easily compressible by the finger.

The lower portion of the vein to its point of ligation beneath the clavicle was collapsed. The resected portion was sent to the pathologist for examination, who reported as follows:

"In the case of L. E. I beg leave to say that the internal jugular vein was thrombosed for a little over 2 inches, the clot was formed from pus and broken down blood and cellular elements. There were a large number of streptococci present; there were also found a few diplococci and pneumococci."

The usual dressing was applied and the patient was returned to bed without having had recourse to stimulation during the operation.

Three hours after her return to bed she had a chill, and the temperature rose to 106.3 F., with pulse 166 and respirations 54. In an hour the temperature had dropped one degree but the pulse was 174 and very weak.

Transfusion with a normal salt solution was now done through the median basilic vein, and oxygen administered every few minutes.

Under this stimulation her pulse improved, and the temperature at the end of twenty-four hours had dropped to 101.4 F.

From this time until the date of her discharge, four weeks later, there was no complication, although her temperature did not reach normal and remain there until nine days after the operation.

That there are a few points of extreme interest in the onset and development of these two cases which will bear dwelling upon for a few moments, I think all will admit.

First—We have here as the cause of the mastoid and sinus involvement an acute inflammation of the middle ear in both. While this is by no means a rarity, still it is an unusual condition following so rapidly upon an acute otitis.

Second—The predominating infection in both cases was due to a streptococcus poisoning; and, it is believed, it is largely due to this, that the rapid involvement of the osseous structure was caused. It was also, on account of this infection, that no other abortive measures were used to cut short the disease, when the cases first came under observation, for, in a large percentage of the cases observed during the past six years, it has been found that where this infection predominates, abortive treatment is of little or no use. In fact, it only masks or retards their development, and much valuable time is lost.

In a report given me by the late house surgeon of the New York Eye and Ear Infirmary, of all cases presenting themselves at this institution since 1897 with this characteristic infection, no matter what the abortive treatment had been, four-fifths went on to operation. So that, given a case of acute purulent middle ear discharge, with incipient mastoiditis, if the infection predominating be that of the streptococcus, no matter what abortive measures are used, the majority of cases reach the operative stage.

Third—In both cases there was no chill, only the sensation of feeling cold; and in a paper on this subject, presented to the American Otological Society four years ago, I called attention to this fact, and at that time stated that we were not justified in waiting for more definite symptoms than this chilly sensation complained of by these patients. That is,

given the other symptoms usually present in these cases, with the patient complaining of feeling cold, we should not wait for a decided chill before operating, for in many of the cases I have observed, a chill has not been present during the entire development of this disease.

Fourth—In the first case here reported, we have a continuously high temperature, never falling below 105.2 F., which, if we follow the typical temperature chart of an ordinary sinus case, is unusual; for we expect a rapid rise, and either a sudden or gradual remission, and oftentimes look for this to be repeated before we decide upon a further investigation as to its cause. In the second case, the temperature differs markedly from that of the first, and, in fact, from the majority of sinus cases, for at no time during the six days that the case was under observation did the temperature register higher than 99.8 F., and in this case, had one been guided to any extent by the temperature, he would hardly have deemed it necessary to operate upon the case at that time.

62 West 52 St.

XXVII.

REPORT OF A CASE OF BILATERAL ABSCESS OF THE
SEPTUM, WITH WELL MARKED SYMPTOMS
OF SEPTICEMIA;

AND

REPORT OF A CASE OF EPIGLOTTIC ABSCESS, WITH
SECONDARY INVOLVEMENT OF THE
CERVICAL GLANDS.*

BY WILLIAM LEDLIE CULBERT, M, D.

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The writer has thought it might be of interest to report the following cases, not only on account of their comparative rarity, but also because of certain peculiar clinical features which they presented.

In a somewhat hurried review of the literature of these two subjects I find quite a few cases of abscess of the septum reported, but only eight cases of abscess of the epiglottis during the past dozen years.

ABSCESS OF THE NASAL SEPTUM.

CASE 1.—Mr. A., 31 years old, broker, a steady cigarette smoker and moderate drinker; no specific history; catches cold readily. Came to the office on August 30th last, with the history that five days previously he had contracted a severe cold. The following day he felt so sick he had gone to bed, and since then had been suffering with chills, fever, sweats, severe pains in his back, limbs and joints, becoming steadily worse. On the fifth day he came to the office; he had a temperature of 104 F. and a pulse of 132; his skin was

*Read before the American Laryngological, Rhinological and Otological Society, at their annual meeting in Lexington, Ky., on April 30, 1903.

clammy; he was very weak, looked very sick, and altogether he presented a picture of marked septicemia. There were, in addition, all the local symptoms of abscess of the septum. The pain was intense and throbbing. Both nostrils were completely occluded, the nose was large and the alae bulging on both sides. The mucous membrane was loose, the tumor boggy to the feel, and fluctuation was easily made out. As he came from quite a distance, and was so very weak, I sent him to a hospital near by. The infected area was cocaineized, and although there was no doubt of the existence of free communication between the abscesses on either side, yet, to make sure of thorough evacuation and free drainage, both sides were incised by a nearly horizontal cut about $1\frac{1}{2}$ inches long, and a vertical cut $\frac{1}{2}$ inch, as far back as possible. The abscess cavity was then irrigated with peroxide of hydrogen, and subsequently with a warm carbolic solution, 1-80. A strip of iodoform gauze was inserted in either side and pushed upward and backward for a considerable distance, where the abscess had dissected up and separated the mucous membrane from the bone. Relief from the pain in the head and other local symptoms was immediate. By the next day the temperature had fallen to normal and all septic symptoms had disappeared. One strip of gauze was removed, and the following day the other strip was taken out. Prompt healing took place, and there was no return of any of the symptoms. The patient left the hospital on the third day and was instructed to observe the discharge from the nose. Five days after the operation he returned to the office. The septum appeared normal. He brought with him a small quadrangular piece of bone with necrosed edges and resembling one of the plates of an ethmoid cell. I have recently tried to communicate with this patient, but learn that (unfortunately, for my satisfaction) he is abroad.

The feature of this case to which I desire to call particular attention, is the occurrence of marked symptoms of septicemia. This is not usual, I believe. The etiology is not clear in this case, no explanation being found beyond an antecedent coryza. Septal abscess is most often the result of trauma, with or without the formation of hematoma.

Ballenger* reports a case following the removal of a septal spur. Freeman† reported six cases of hematoma, three of which became purulent. In all of these cases there was a free communication between the collections on both sides of the septum. In a paper read before the Laryngological Section of the New York Academy of Medicine in February, 1899, Waterman reports three cases, one of which was bilateral with no communication between the two sides. A number of cases are reported by Labinski,‡ Wagner,§ Delevan,§ and others. From these it appears that the exciting cause is often obscure—traumatism, infectious fevers, and metastases from other neighboring pus foci having been brought forward as the most likely cause. In the case just reported, the question arises as to whether, in view of the discharge of a plate of bone resembling the ethmoid in structure, the infection did not start in this region. It is also stated that in most cases the abscess is unilateral and confined to the cartilaginous septum. In this case it was bilateral, and both cartilaginous and bony septum were involved.

ABSCESS OF THE EPIGLOTTIS.

CASE 2.—The patient, Mr. H., aged 34 years, merchant, came to me on August 11, 1902, complaining of pain on deglutition, difficulty in breathing, thick and difficult speech, and a sense of swelling in the throat. He is a smoker, drinks moderately; no specific history. He is a gouty subject, and has suffered from repeated attacks of quinsy. His statement, when he presented himself, to use his own words, was, "I think I have another attack of quinsy, but it seems to be displaced downward." These symptoms had lasted for two days before seeking medical aid. The only etiological factor besides gout was a slight coryza. Examination showed the anterior chain of cervical glands on both sides of the neck swollen and tender, more so on the left, corresponding to the position of the abscess. He had a temperature of 100.5

* *Memphis Lancet*, March, 1899.

† *Laryngoscope*, October, 1901.

‡ *Deutsche Med. Wochenschrift*, Sept. 9, 1901.

§ *Archives of Laryngology*, Vol. I, No. 1.

§ *Archives of Laryngology*, Vol. IV.

F. and a pulse of 90. The laryngoscope revealed a mass at the base of the epiglottis filling up most of the glosso-epiglottic fossa, pointing upward and originating apparently at the base of the anterior surface of the epiglottis a little to the left of the medial line. The epiglottis was displaced backward and pushed somewhat toward the opposite side. The mass was about the size of a small walnut. The epiglottis was injected and slightly swollen, the edge, however, being fairly sharp. There was considerable inflammation of the surrounding tissues, but no edema and no involvement of the larynx. Operation was performed without delay and without an anesthetic. An attempt was first made to incise the abscess with a straight knife, but it was found impossible to puncture it low enough down to secure a thorough evacuation and drainage by this means. A sharp, curved aneurysm needle was then tried. With the guidance of the laryngeal mirror, the needle was thrust into the base of the swelling on the left side and then withdrawn with an upward motion thus tearing the tissues a little. Through the opening thus made, the pus found free exit. Relief was instantaneous. Subsequent treatment consisted of a hot gargle at frequent intervals and in the application of ice to the glands. The patient left the hospital two days afterward, and by the 18th all swelling in the glands had disappeared. A recent examination which was made showed an absolutely normal condition, without any evidences of his former trouble.

The interesting feature of this case I take to be the extensive involvement of the cervical lymphatic glands. This, so far as I have been able to learn, is not usually attendant upon epiglottic abscess. As to the precise point of origin of epiglottic abscess, writers differ. Zublinski* and Caz† report cases of phlegmonous inflammation of the glosso-epiglottic fossa, and appear to think that abscess of this region originates in the loose connective tissue on the floor of the fossa. Howe‡ reports a case in which the abscess developed on the interior surface of the epiglottis. Abscess of the lingual

* Deutsche Med. Wochenschrift, Feb. 23, 1899.

† Archiv. für Laryngology, Band VIII, Heft 2, 1898.

‡ N. Y. Med. Jour., 1889, p. 628.

tonsil, according to Swain, Saminsky and others, is not so uncommon, and the epiglottis, from its relation to the lingual tonsil, is prone to partake of inflammatory processes of this tissue. Chamberlain* reported a unique case of cold abscess, in which the whole membranous covering of the epiglottis was undermined. In the writer's case, the origin is believed to have been at the base of the epiglottis. As to etiological factors in general, typhoid fever, hot fluids, foreign bodies, and extension from neighboring parts are mentioned. In one reported case only, that of Fredet,† there was an extensive edema of the glottis with a fatal result. As a rule, however, comparatively slight laryngeal involvement is noted.

54 East Thirty-fourth Street.

* Medical Record, 1891, p. 427.

† Union Medicale. 1885, p. 1068.

XXVIII.

A CONTRIBUTION TO OUR KNOWLEDGE OF THE CAUSES OF LEFT RECURRENT LAR- YNGEAL PARALYSIS.

DR. O. JOACHIM,

NEW ORLEANS, LA.

Every now and then it becomes necessary for us to clear our conceptions of the estimate and value we should place upon certain accepted symptoms and conclusions: to enlarge, restrict or modify the same in the light of our own observations, or of investigations and interpretations placed upon them by other observers. A single case, presenting such a well recognized picture as is seen in paralysis of the left recurrent laryngeal nerve can at times tax our powers of diagnosis to the utmost, cause us to be satisfied, if we have interpreted our observations aright; and move us to serious reflections, if the post mortem reveals conditions, which we have not been able to discover or have not interpreted aright.

The knowledge of our limitations in diagnosis can only act as an additional incentive to our efforts to profit by the past, and to double our endeavors in the future. The existence of such limitations, implying as it does the easy possibility of differing opinions, was demonstrated in a case recently under observation, which was examined by several highly competent medical men. The case is of interest for this reason and of importance because the post-mortem showed a very unusual cause for the paralysis of the recurrent laryngeal nerve. The history of the case as furnished by Dr. S. K. Simon is epitomized:

Wm. M.—, age 4, a German by birth, fisherman by occupation, was admitted on February 9th, 1903. Difficulty in swallowing began five weeks previous to admission; hoarseness, one week previous. An indefinite soreness was

felt and complained of across the chest about the level of the second rib. His family history was entirely satisfactory as far as within the patient's knowledge. He had measles as a boy; syphilis was denied, and no indications were observable. He had had gonorrhea, and living in a swampy region, a single and severe attack of malaria. Beyond this he enjoyed good health and a fine physique. A year previous to his admission he had difficulty in swallowing, which was relieved by a single introduction of an esophageal bougie. He admitted of having had slight attacks of this difficulty since that time; not sufficient, however, to cause more than an annoyance. His weight on admission was 15 to 20 pounds less than usual, and the difficulty of getting food down, especially liquids had become great, causing excessive spells of coughing. The expectorated and regurgitated material was at the time of admission frequently streaked with blood. Laryngoscopic examination showed cadaveric position of the left vocal cord. There was no indication of enlargement, induration, or pain on light or deep pressure, or an active or passive motion of the parts. No enlarged glands anywhere about the neck. Sensibility of the larynx and pharynx not impaired. The area of heart dullness was within usual limits; the heart sounds normal and weak. Spleen and liver normal; abdomen retracted and somewhat tender. Physical examination of the lungs, when admitted, was reported normal; digestive functions with exception of deglutition not complained of. Sputum free of bacilli of tuberculosis on repeated examinations. Pulse rate normal, slow and full; of appreciably smaller volume in left than in right radial artery. The same difference existed in the subclavian artery. Temperature normal; never exceeded 99 degrees subsequently, and frequently was slightly sub-normal. When examined by the writer, the lower right lung was full of large mucous rales, but relatively free subsequently. In a lesser degree, these rales appeared and disappeared at different times in other portions of both lungs. The heart action was weak, and in the left half of the inter scapular space the writer thought he heard a murmur on cessation of breathing, which he interpreted as a bruit. An x-ray examination made by one of the consultants, showed an abnormal trian-

gular dark area in the upper part of the mediastinum. An esophageal bougie encountered an obstruction about the level of the third interspace. Emaciation, dysphagia, hemoptysis, pulse rate gradually increased with a rapid downward progress of the patient. The administration of potassium iodide when first observed seemed to be of benefit, but with the increasing difficulty of swallowing had to be discontinued. Nutritive enemata and heart stimulants supported the patient until shock due to operation of gastrotomy, caused exitus on April 7th.

An autopsy of the organs concerned was held, the consultants being present:

Both lungs extremely bound down by old adhesions; abscess in middle lobe of right lung. Abscess at apex of left lung. Trachea ulcerated and perforated at bifurcation. Ulceration of anterior wall of esophagus, communicating with trachea about one inch in length at lower portion of ulceration. In the esophagus, about one inch below the perforation was found an annular structure. Bronchial and other glands not enlarged. Heart, normal. Larynx without ulceration. Abscess pus not tubercular. Anatomical diagnosis; ulceration of esophagus and trachea; stricture of esophagus; metastatic abscesses.

Epicrisis: In the light of the autopsy, we naturally assume the sequence of events to have been esophageal stricture, followed by ulceration of the esophagus above the stricture and erosion of trachea; gradually enlargement of communication; lung abscesses due to entrance of solid infectious matter and metastasis. The autopsy explains the recurrent paralysis by involvement of the nerve in the inflammatory process surrounding the ulceration. The diminished radial and subclavian pulse were due to the imbedding and constriction of the subclavian artery in the adhesive process surrounding the abscess in the very apex of the left lung. The question naturally presented itself, why these conditions escaped the observation of all the consultants and how far the existence of the recurrent paralysis could have helped us in arriving at a correct diagnosis?

It is needless to say that in full appreciation of the importance of the symptoms of recurrent paralysis we searched for all the

recognized and recognizable causes which led to the suspension of its function. The central as well as the systemic causes like catarrhal, toxic, rheumatic or infectious influences we could exclude; equally well some of the anatomic lesions affecting the nerve in its course, as pericarditis, pleurisy and chronic pneumonia, tuberculosis, esophageal cancer, pressure from benign or malignant thyroid enlargement, glandular tumefaction, or neoplasms of the neck. Our consideration embraced mediastinal neoplasms and aortic aneurism. All of the observers located the trouble in the mediastinum, but differed as to the nature, holding to enlarged bronchial glands, malignant neoplasm and aortic aneurism of the sacculated variety, or occupying the concave portion of the arch. The occasional absence of a bruit in the aortic aneurism was remembered. The existence of a mediastinal enlargement seemed to explain the pronounced symptom of dysphagia by pressure on the esophagus and the paralysis of the recurrent laryngeal seemed to account for the entrance of food and liquids into the lungs and resulting in excessive coughing spells and regurgitation. Knowing the result of the autopsy these deductions were not sound. The sensibility of the larynx and pharynx being unimpaired, regular and copious entrance of food into the larynx was not a necessary result of the recurrent laryngeal nerve paralysis; while retention of food in a dilated esophagus above the compression would not necessarily lead to violent and regular coughing spells. Every assumed condition was prohibitive of introduction of an esophageal bougie, and no positive information could have been gained by it. The difference in the pulse volume found an effective and unexpected solution in the autopsy finding. At the very apex of the left lung a large abscess with a strongly adherent capsule existed embedding the subclavian artery. The history states that this difference was less marked toward the end of life, which I venture to explain by the ability of the narrowed lumen of the vessel to better accommodate the lessened amount of blood as emaciation progressed. While remembering the possible anatomic sources of error, the writer's opinion was unquestionably influenced by this symptom, which extended to the subclavian artery, especially so, as Semon in his masterly contribu-

tion to Heymann's hand book says, that the smallest abnormality found requires our strictest attention. General experience leads us to look for an aneurism when no subjective or objective symptom can be found in the course of the recurrent laryngeal in the neck to account for the suspension of its function. The same author mentions aortic aneurism and esophageal carcinoma as by far the most frequent causes of recurrent paralysis. M. Schmidt devotes four pages to aneurism as an etiologic factor in the production of recurrent paralysis and three-quarters of a page to all other causes. Bosworth, however, upon the basis of his personal observation utters a caution as to the frequency of aortic aneurism as a cause of recurrent paralysis. He says: "While this latter affection not unfrequently gives rise to it, it is probably a mistake to regard it as the most frequent cause." This is well worth bearing in mind. The cause which has given rise to the recurrent paralysis in our case has found no mention anywhere as far as present investigation has shown, and while probably of rare occurrence, adds this cause to our knowledge of the subject. The primary cause of the stricture of the esophagus could not be traced. The specimen, which has been preserved, is to be further studied from this and other points of view. The abscess in the right lung was probably due to direct entrance of food, being in relatively close proximity to the ulceration. The adhesions of the lungs were so complete and dense that the parts were torn before a direct connection could be traced. The abscess in the extreme apex of the left lung was probably metastatic, being above the level of the ulceration and of smaller size than the right abscess. Both abscesses escaped detection on physical examination. The large mucous rales in the right lower lobe were extremely copious and masked all other auscultatory sounds. The recumbent position probably accounted for the lack of dullness on percussion in this and in the abscess of the left apex by permitting a relatively unoccupied space between itself and the chest wall.

XXIX.

A DEMONSTRATION OF SOME EXPERIMENTS ON THE NATURE AND SPECIFIC TREATMENT OF HAY FEVER.*

BY SIR FELIX SEMON, C. V. O., M. D., F. R. C. P.,

PHYSICIAN EXTRAORDINARY TO HIS MAJESTY THE KING.

In November, 1902, Professor W. P. Dunbar, the Director of the State Institute for Hygiene of Hamburg, published a pamphlet on the Cause and Specific Treatment of Hay fever,† in which he reported the results of his investigations concerning that troublesome affection. He had succeeded in isolating from the pollen of certain grasses a toxic substance which, when applied in very small quantities to the eyes or nostrils of people predisposed to hay fever, had in a few minutes produced in a more or less marked degree the local symptoms characteristic of hay fever, whilst the same quantity of the toxin when applied to the eyes or nostrils of persons not predisposed had remained without any effect.

Further he had succeeded, by injecting the pollen of rye, maize and several other grasses into the circulation of various animals (rabbits, goats and horses) in producing an anti-toxin which when applied to the eyes or nostrils of hay-fever patients in whom the local symptoms of hay fever had been artificially produced by the previous injection of the toxin, immediately quelled the subjective symptoms, and after a few minutes caused retrogressive changes in the objective symptoms, produced by the toxin.

These are the principal results—speaking from the practical point of view only—so far obtained by Professor Dunbar though his communication, which has been recently followed

*From the British Medical Journal, March 28, 1903.

†Munich and Berlin: Oldenbourg, 1903.

by a second* teems with other interesting points. Thus I mention that whilst the pollen of twenty-one different kind of grasses have so far been found to contain the toxic substance producing hay fever, the pollen of roses, limes, wormwood and other plants, which have been, and are still, frequently accused of causing hay fever in those specially predisposed, have been found by Professor Dunbar to be inactive. It is not the ethereal oils contained in the pollen which produce the typical symptoms. Prof. Dunbar has obtained from pollen three different products: (1) The true toxic substance, (2) a starchy matter, and (3) the ethereal oils, and only the first named (which he has isolated in the form of a white powder) produces the typical symptoms, whilst the ethereal oils although they have a certain irritating smell, are deficient in toxic properties. His most recent researches lead him to believe that the toxic substance is a proteid, as it gives the characteristic proteid reactions. Finally, it appears from his investigations that it is not the spicula, as it had also been surmised, of certain pollen which mechanically produce the irritation, inasmuch as the pollen of the grasses in question have absolutely smooth surfaces. For further details concerning these and similar points, I must refer to Professor Dunbar's original communication, which it may fairly be hoped will soon be published in an English translation.

At the present stage of the investigations it appeared desirable to Professor Dunbar that his researches should be controlled by other independent observers, and with this object in view he was good enough not only to send me small quantities of both the toxin and the antitoxin, but to depute his assistant, Dr. Carl Prausnitz to help me in the experiments which I now report. I take this opportunity of expressing both to him and Dr. Prausnitz my sincere thanks for their kindness.

The toxin was, I understand, produced by extracting crushed maize pollen with saline solutions at body temperature for about six hours, and by precipitating the toxin with

*Weitere Beiträge zur Ursache und specifischen Heilung des Heufiebers, *Deut. Med. Woch.* 1903, No. IX.

alcohol. The antitoxin was obtained by injecting horses with this extract. Many horses were, however, found refractory, the best results were obtained from young thoroughbreds.

The experiments in question were performed on March 19th in the presence of and with the kind co-operation of Dr. Prausnitz, Mr. Lanyon Owen, Mr. Armour, Dr. E. Law, Mr. Louis Taylor, Dr. Tilley, Mr. Waggett and my eldest son.

On the six last named gentlemen and myself control experiments were undertaken, whilst the two first-named, who are victims of hay fever, very kindly allowed a complete series of experiments to be performed on them. In addition to them, three patients of my own—Miss C., Miss K., and Mr. R. S.—were sufficiently animated by love of science, if not by the hope of being ultimately relieved of their troublesome affection, to submit to the by no means very agreeable experiments, and to all of them I hereby tender my sincerest thanks.

The experiments began by the instillation by means of a pipette of one drop of a solution of the toxin (1 in 1000 of normal saline solution), to which was added one-fourth per cent. of carbolic acid into the left eye of the seven gentlemen on whom the control experiments were to be performed. The general effect in all of them was, with two exceptions, which will be presently referred to more fully, absolutely negative. A momentary sensation of irritation which occurred in a few instances immediately after the injection, was no doubt due to the addition of the carbolic acid, and invariably passed away in a few seconds.

It was different in the case of Dr. T.; he after a few minutes complained of a feeling of itching and burning in the injected eye, the caruncle began to swell, the lower lid became considerably congested and the conjunctival vessels were markedly suffused. These sensations persisted for about half an hour, and then gradually disappeared.

It was at first thought that it was perhaps not quite fair to judge from this case, inasmuch as the gentleman in question not merely suffers, although only very occasionally, from asthma when residing in certain localities, but also that, as he stated; the mucous membranes of his eyes and nose are extremely sensitive to wind and dust, particularly when riding

or cycling, a statement very frequently made by hay fever patients. It seemed, therefore, by no means impossible that his case was one of greater susceptibility to the poison of hay fever than those of ordinary non-predisposed persons.

Another suggestion, however, was made to the effect that the carbolic acid contained in the toxin might have been the source of more lasting irritation. In order to test this further a control experiment was made on March 20th, one drop of toxin being instilled into the right eye, and a drop of carbolized water in the other. The characteristic phenomena were produced in that eye only into which the toxin had been instilled. This fact certainly points in the direction of the conclusion that Dr. T., although not an actual sufferer from hay fever, is more susceptible to its poison than the general run of ordinary non-predisposed persons.

The second experiment which points in the same direction refers to my own case. I have never suffered from hay fever, although not infrequently I am liable to sudden violent paroxysms of sneezing, followed by considerable rhinorrhea, particularly in the early morning at any time of the year. The instillation of the toxin into my left eye had no immediate effect whatever. About six hours after the experiment, however, I was suddenly taken with several very violent fits of sneezing, followed by profuse secretion of watery fluid from my left nostril only, which for a time became almost completely obstructed. At the same time I experienced sensations of heat, burning and soreness in the left half of my nose, all of which were perfectly new to me, whilst in my left eye, although it was not congested, I had a feeling as if I had some particles of sand between the upper eyelid and the eyeball. These symptoms lasted until I went to bed at about 11:30 p. m., but had completely disappeared next morning. It was certainly remarkable that all the symptoms named were restricted to my left eye and nostril, the toxin having been instilled into the left eye.

In order to control this observation, on March 20th at 6 p. m., a drop of pure toxin was instilled into my right eye. In the course of the evening nothing further happened.

Shortly after awakening on March 21st, however, I sneezed a few times, and this was followed by watery secretion from both

nostrils, though undoubtedly more from the right, which for about ten minutes became quite obstructed and then very suddenly quite patent again. There was none of the feeling of heat, burning, and soreness which I had experienced in the left half of my nose on the evening of March 20th. Four or five minutes after the nasal symptoms had quite passed off, I suddenly had a little wheezing in my chest, which was quite audible, but passed off within two or three minutes. The last named phenomenon is one from which I hardly ever suffer.

Although neither of these experiments is in any way conclusive, it would seem probable that I am—to some degree—susceptible to the influence of hay fever toxin, and that the poison, without producing at first any local symptoms in the part into which it was instilled, traveled in minute quantities through the naso-lachrymal ducts into the nose, and there, after the lapse of a few hours, produced the characteristic nasal symptoms.

None of the other gentlemen, as I have ascertained by subsequent inquiry, have experienced any after effects from the instillation of the toxin.

EXPERIMENTS ON PATIENTS LIABLE TO HAY FEVER.

I now come to the experiments made with toxin and anti-toxin in the five persons suffering at the typical time of the year from hay fever, who kindly submitted to be experimented upon. Owing to Dr. Prausnitz's presence, we had the privilege of not merely experimenting with the artificially produced toxin, but also with the actual pollen of maize collected last year, and with some fresh pollen of grasses obtained quite recently at Genoa, and sent to Professor Dunbar by some hay fever patients, who are now staying in that neighborhood, and have just had their first attack this year.

In the following description the exact times at which the experiments were conducted and the sensations and objective symptoms which were recorded are stated, as they were taken down at the time. Several of the medical men present cooperated in controlling these times, and the results were written down immediately.

CASE I.

Mr. L. O., aged about 32, has suffered from hay fever practically all his life. His father was similarly affected. He is the only one of several brothers and sisters to whom the tendency has been transmitted. The attack is quite typical, affecting the eyes and nose, and very occasionally causing asthma. He has been treated in one nostril with the galvano-cautery with practically no effect.

At 2.49 p. m. one drop of a mixture of equal parts of a toxin solution (1 in 1000) and normal horse serum was instilled into the left eye; into the right eye one drop of a mixture of equal parts of the toxin solution (1 in 1000) and antitoxin serum.

3.5 p. m.—Sensation of heat in left eye, caruncle of left eye beginning to swell and to get reddened, itching begins.

3.10 p. m.—No increase in symptoms.

3.10 p. m.—Symptoms of heat, etc., increasing.

3.17 p. m.—Complains much of heat and discomfort in the left eye, antitoxin (one drop) instilled into the left eye, and practically immediately afterward the itching improved, but not the feeling of heat.

3.21 p. m.—Heat has disappeared.

3.27 p. m.—Pollen of maize rubbed into the right nostril.

3.29 p. m.—Itching begins in the tip of the nose.

3.31 p. m.—Irritation increases all round the nose.

3.33 p. m.—Sensation of heat in both eyes, and itching in eyes and nose.

3.39 p. m.—More pollen introduced into the right nostril.

3.42 p. m.—Antitoxin (2 drops) inserted in the right nostril.

3.44 p. m.—Great relief in both eyes and nose.

3.50 p. m.—One drop of mixture of toxin (1 in 500) with equal quantity of normal serum instilled into the left eye, and a similar solution with antitoxin serum into the right eye.

3.52 p. m.—Sensations of heat and itching in the left eye.

3.53 p. m.—In the left eye pricking and general irritation.

3.54 p. m.—Left caruncle again getting very red. Obstruction in the right nostril. Increased irritation and heat in the left eye.

4.0 p. m.—The throat feels uncomfortable; soreness and irritation. One drop of the antitoxin injected into the left eye, the itching stopped almost immediately.

About 5 p. m., the sensation of heat returned in the left orbit; then the usual headache began and some slight dyspnoea. At 5.45 p. m., a sneezing attack, but not a severe one, began. In the evening the usual feeling of lassitude was experienced, always present in a greater or less degree in the patient's case according to the severity and length of the attack. (The information about these later effects was kindly communicated to me by letter next morning.)

CASE II.

Dr. P., aged 26. Several members of the family have hay fever, and he has suffered for about fourteen years from genuine hay fever at the typical time, with the characteristic symptoms in eyes and nose. He has once had asthma at the close of an unusually severe attack of hay fever. Treatment with the galvano-cautery undertaken seven years ago was successful for two years.

3.6 p. m.—One drop of a mixture of equal parts of a toxin solution (1 in 500) and normal serum was instilled into the left eye; into the right eye 1 drop of a mixture of equal parts of a toxin solution (1 in 500) and anti-toxic serum. The right eye remained absolutely normal throughout.

3.9 p. m.—In the left eye sensation of burning and itching.

3.10 p. m.—Left caruncle red and swollen.

3.12 p. m.—Caruncle and lower edge of lower lid of left eye red and much swollen; conjunctival vessels injected.

3.29 p. m.—One drop of antitoxic serum injected into the left eye.

3.30 p. m.—Itching and burning nearly gone.

3.45 p. m.—Swelling and suffusion of left eye decidedly less.

3.37 p.m.—Into the left nostril some maize pollen was introduced.

3.38 p.m.—Tickling sensation in the nose; desire to sneeze.

3.44 p.m.—Patient sneezed once.

3.54 p.m.—Rhinoscopic examination: Injection of the left inferior tubinated bone; watery fluid running down from the

middle fossa; mucous membrane swollen; right nostril quite normal.

3.56 p.m.—Increase of nasal symptoms; a good deal of rhinorrhea, two sneezing attacks, constant desire to sneeze.

After this the symptoms very gradually abated, and at about 4.30 p.m. matters had almost returned to normal conditions.

It ought to be stated there that Dr. P., who has often experimented on himself, informs me that his susceptibility has—at any rate transitorily—been considerably diminished since, a week ago, 1 c.cm. of antitoxin was injected subcutaneously into his left arm.

CASE III.

Mr. S., aged 28, has for nearly twenty years suffered from genuine hay fever, nose and eyes alone being affected; no hay asthma. It always comes on in June. The nasal mucous membrane, when I saw the patient (March, 1902), was considerably swollen. He submitted to prophylactic galvanocautic treatment of the nasal mucous membrane in April last, but the result was absolutely negative, the hay fever being as bad as usual last season.

2.57 p.m.—Into the left eye one drop of a mixture of equal parts of a toxin solution (1 in 1,000) and normal serum was injected; into the right eye one drop of a mixture of equal parts of the toxin solution (1 in 1,000) and antitoxic serum. No irritation felt in either eye.

3.6 p.m.—Into the left eye one drop of a toxin (1 in 500) and normal serum mixture; into the right eye one drop of a toxin (1 in 500) and antitoxin mixture.

3.8 p.m.—In the left eye itching, burning, and desire to rub it.

3.11 p.m.—The sensation is passing off.

3.15 p.m.—Conjunctival vessels of left eye much congested. In the right eye a slight feeling of irritation, which passed off quickly.

4.20 p.m.—The patient feels sure that he is suffering from an attack of hay fever.

3.29 p.m.—He has all the ordinary dull feeling of recovery from an attack of hay fever.

3.36 p.m.—Symptoms practically disappeared.

CASE IV.

Miss C., aged 21, has suffered for many years from genuine hay fever at the typical time with the characteristic symptoms in the eyes, nose, and chest. She always suffers severely, and was once treated with the galvano-cautery with transitory effect.

3.14 p.m.—Into the left eye one drop of a mixture of equal parts of a toxin solution (1 in 1,000) and normal serum was injected; into the right eye one drop of a mixture of equal parts of the toxin solution (1 in 1,000) and antitoxin serum.

3.20 p.m.—Left caruncle red. Conjunctival vessels injected. Feeling of irritation in the right eye.

3.25 p.m.—No increase of symptoms. Into the left eye one drop of toxin (1 in 500) normal serum mixture; into the right eye one drop toxin (1 in 500) antitoxin mixture.

3.32 p.m.—In the left eye, feeling of irritation; in the right eye, none.

3.37 p.m.—Into the left eye one drop of antitoxin.

3.39 p.m.—Left eye rubbed with maize pollen.

3.40 p.m.—Throat getting sore, just like in an ordinary attack.

3.44 p.m.—In the left eye feeling of irritation.

3.45 p.m.—Left nostril rubbed again with maize pollen.

3.46 p.m.—In the left eye increase of irritation.

3.49 p.m.—Left caruncle fiery red. One drop of antitoxin into left eye.

3.53 p.m.—One drop of antitoxin into the left nostril.

3.55 p.m.—Patient feels on the whole more comfortable.

4.2 p.m.—Left eye still irritated. One drop of antitoxin.

4.3 p.m.—Irritation in left eye has ceased.

4.8 p.m.—Rhinoscopic examination: Left nose completely obstructed, mucous membrane over middle turbinated bone so much swollen as to actually touch the septum. Appearance as often seen in genuine hay fever. The right nostril wide open; normal.

4.11 p.m.—Two drops of antitoxin into the left nostril.

Toward the close of this experiment the patient was ex-

ceedingly depressed and presented the characteristic appearance of hay fever patients during a severe attack.

The patient informed me on March 20th that she had felt very ill, just as in a typical attack of hay fever during a little while after the experiment, but that the symptoms had gradually passed off in the course of the evening, and that now she felt quite well again.

CASE V.

Miss K., aged 45, was seen in June, 1902, a most typical case of hay fever, very characteristically described by the uncommonly intelligent patient. There is a history of hay fever in other members of the family. She herself has suffered for over 20 years with the characteristic symptoms in eye, nose, throat, and chest.

3.22 p.m.—Sniffed up grass pollen recently obtained from Genoa. No result.

3.30 p.m.—Into the left nostril one drop of a toxin solution (1 in 500).

3.35 p.m.—Feels a little uncomfortable.

3.36 p.m.—Uncomfortable sensation has increased in both nostrils.

3.38 p.m.—Great desire to sneeze.

3.41 p.m.—Into the left eye a mixture of equal parts of toxin (1 in 500) and normal serum; into the right eye one drop of a mixture of equal parts of a toxin solution (1 in 500) and antitoxic serum.

4.20 p. m.—Left eye itching; left caruncle much suffused; right caruncle abnormally pale.

4.3 p. m.—Into the nostrils one drop of toxin solution (1 in 500).

4.6 p. m.—Itching in the left eye has ceased, the right nostril is beginning to tickle; typical sensation of irritation. Feeling of itching at the back of the soft palate, which increased during the next two minutes.

4.12 p. m.—The patient complained of the frontal headache from which she usually suffers during the hay-fever attack. In the nostril nothing is experienced but the ordinary irritation.

During the afternoon and evening the tickling continued,

the patient sneezed twice at 4.45 p. m., again at midnight, and at 8 a. m. on the following morning. In the evening throat, nose, and ear on the right side felt sore and tired, as they do after a bad attack of hay fever. Next morning patient still felt as if she was suffering from a slight summer attack of hay fever.

(Information as to after-effects given by letter, March 20.)

CONCLUSIONS.

From the above experiments the following conclusions, I think, may fairly be drawn:

1 There can be no doubt that Professor Dunbar has succeeded in extracting from the pollen of certain grasses (maize, wheat, rye, *anthoxanthum odoratum*, *agropyrum repens*, *cynosurus*, etc.), a toxin which when instilled into the eyes or nostrils of people predisposed to hay fever, produces in these parts the characteristic subjective and objective symptoms of the disease.

2 The toxin, when injected into the eyes or nostrils of people not predisposed, produced, in the great majority of cases, no symptoms whatsoever, but it certainly appears from Dr. T's and my own experiences as if there were instances of transition in which, although the persons experimented upon never suffer from typical hay fever, they are yet more susceptible to the influence of the toxin than the ordinary run of people.

3. The effects of the toxin in the people suffering from hay fever are as variable in intensity as are the attacks of the affection itself, both with regard to the local and the constitutional symptoms.

4. Professor Dunbar's antitoxin certainly produces immediate disappearance of the subjective, and after a few minutes great amelioration of the objective symptoms.

5. The mixture in equal parts of a toxic solution (1 in 500) and the antitoxin serum suffices to neutralize the specific effects of the toxin.

6. The effects of the antitoxin appear in some instances to be sufficient to prevent a reappearance of the subjective symptoms, whilst, in other instances repeated instillations of the antitoxin were required to produce ultimately the return to normal conditions.

It is hardly necessary to add that this can only claim to be a preliminary report on a very interesting and important subject. We are, as it were, on the threshold of facts which, if our expectations should be realized, would in many respects open a new era for the better understanding and more efficient treatment of a most troublesome and common disease. At the same time, it cannot be too emphatically stated that all we know at the present is not sufficient to build excessive therapeutic hopes upon, and this for the following reasons:

1. We do not yet know what the nature of the special predisposition is which makes one person react violently to the influence of both the natural pollen and of the artificially-produced toxin, whilst it leaves another quite unaffected.

2. Whilst it may be justly hoped that it will be possible to produce an even more effective serum no guarantee can at present be given, nor do we know for certain whether it will be possible to produce such antitoxin in sufficient quantities to use it extensively. It may, however, confidently be hoped that such will be the case.

3. Whilst the antitoxic serum as at present produced quickly neutralizes the local effects of the toxin, it is impossible to foretell—and on this point I wish to insist very strongly—whether in cases of genuine attacks of hay fever, an even more powerful serum than that at present prepared, applied by way of instillation into the affected mucous membranes, or by subcutaneous injection or by internal administration, will arrest all the symptoms when once fully established, and even if it should do so, whether the effect will be lasting, or whether the symptoms may not return.

4. Finally, it is equally impossible to foretell whether by the prophylactic application of a very powerful serum we shall succeed in altogether preventing the actual outbreak of an attack in those specially predisposed.

I know I am in perfect accord with the original investigator in giving this strong warning against premature hopes which ultimately may not be fulfilled. At the same time, I think there cannot be any doubt that Professor Dunbar has made a very interesting and important discovery, which, it may be devoutly hoped, in the interests of many thousands of sufferers, will ultimately lead to the development of an effectual specific treatment of this very troublesome affection. He has most kindly promised to keep me *au courant* of his further experiments, and I, too, hope to continue my own researches. When anything new can be reported, I hope to return to the subject.

XXX.

CHAIRMAN'S ADDRESS BEFORE THE INDIANAPOLIS
MEETING OF THE MIDDLE SECTION OF THE
AMERICAN LARYNGOLOGICAL, RHINO-
LOGICAL AND OTOLOGICAL
SOCIETY, APRIL, 8, 1903.

By L. C. CLINE, M. D.,

INDIANAPOLIS.

PROFESSOR OF RHINOLOGY, LARYNGOLOGY AND OTOL-
OGY IN THE MEDICAL COLLEGE OF INDIANA.

Gentlemen:—It affords me great pleasure to welcome you to this, our “no mean City” situated as it is at the center of our nation’s population. The time that is consumed in coming together, presenting and discussing subjects pertaining to our field of work is of as great value to us and to those we serve as are the great commercial and industrial conventions to their followers.

Our best work does not emanate from our own efforts in our daily routine, but comes through mingling with our fellow-workers, exchanging views, giving and receiving kind but firm criticism of our theories, modes of operation and inventions. When we look over a period of two decades we marvel at the great strides and changes that have occurred in the pursuit and practice in all branches of our profession, and especially in our own.

It has been said that the American doctor with all his energy and his push is too prone to take up and adopt all the fads and theories of practice without first giving the subject due consideration. While this in many instances is true we are just as eager to correct our mistakes and set up a signal of warning as we are to adopt them. For example we have seen the arrival and departure of the sulphuretted hydrogen gas bag which was reported to cure all tubercular and germ

diseases of the air passages and alimentary tract. We have witnessed the craze, to remove ovaries by our friends in the abdominal field, come and go. We have seen the great wave of treatment which expresses itself in the indiscriminate use of the saw and cautery sweep the country, I am sorry to say still raging with some superficial and in discrete manipulators, whose sole object is to open the breath-way quickly regardless of consequences.

The physiologic functions of the turbinates and nasal mucosa have been partly or wholly destroyed in many noses by the indiscriminate use of the cautery or cutting instruments for the relief of existing disturbances, whereas if the cases had been more carefully studied and the treatment directed toward the true cause the nasal membrane could have remained intact, and after the relief of the congestion the patient left with a normal nose capable of performing its physiologic functions. I do not mean to decry the use of cautery, the scissors and saw, but their indiscriminate use in non-selected cases.

We have been passing through an age of fads and the departments of medicine and surgery have contributed a good share to their support. In our zeal to push forward and present something new we are too prone to act upon suggestions without due consideration of the surrounding influences that may have a bearing on the subject. We need to lay more stress on the etiology and pathology of disease.

The importance and rapid development of appliances and methods of treatment of the upper air passages and the commercial shrewdness of apparatus and instrument makers have been the cause of thousands of doctors equipping themselves with cautery-batteries and other apparatus without preparation or special knowledge of the normal and abnormal structures with which they were to deal, attempting to cure all the disturbed conditions of the air passages with the liberal use of cocain and the cautery-knife, snare or scissors. Time and disappointment have about corrected those erroneous notions and the cautery has taken its place, with those that are informed, and is only occasionally used in selected cases. Specialism is looked upon by those older in the profession who have not had the advantages of

modern teaching, as minimizing in a narrowing or contracting sense, while quite the contrary is true with those that are up in the work. The specialist should not only have a thorough knowledge of his subject but he should possess a knowledge of general medicine. Some claim that the specialist exceeds his rights when he looks beyond the local lesion and should refer his patients back to general medicine for further treatment. But as a matter of fact a large per cent. of the local lesions are due to systemic conditions.

A specialist should be able to analyze and group his cases and determine which are due to local lesions and what local lesions are due to systemic conditions. The specialist that does not take into account systemic conditions is not worthy of the name of specialist.

In anticipating what I would say in addressing you on this occasion nothing has appealed to me more than to call brief attention to some etiological factors and the results obtained by the different methods of treatment of a certain class of patients that apply to us for relief. It is quite noticeable that during the last few years more and more attention is being paid to the study of general conditions with local manifestations.

It is important that we should possess an intimate knowledge of all adjacent and associated structures together with their physiologic relations to each other as well as the general system. It is becoming necessary to devote more time and attention to the chemistry of the fluids of the body and their influence as manifested in local disturbances. More attention is being paid to the nutritive and eliminating functions of the body. We are all more or less familiar with cases of infiltrated, congested and irritable mucous membranes following influenza or grippe, and know that some of these cases resist all local measures of treatment until the general system is taken into account and the secretive, eliminative and nutritive functions are re-established. It is altogether likely that changes take place in the blood through the influence of the toxins, and that these new compounds are deposited in the tissues. In many cases treatment will bear out this view as hygienic and alterative measures produce the best results. We are all more or less acquainted with the in-

creased congestion and glandular activity in the upper air tracts in diseases of the heart, the kidneys, liver and gastrointestinal tract.

When we look at the local lesions from a broad or general medical standpoint, excluding congenital or acquired deformities, we are surprised at the great number of cases that have some systemic factor in their etiology.

The condition to which I wish to direct my remarks, more particularly, is that designated by the terms lithemia, the uric acid or gouty diathesis. To my mind it is questionable as to whether there is a hereditary tendency to lithemia or gout, or whether the fault is not due to our method of living and the large consumption of meat. There is never an excess of nitrogen in a meatless diet, but with a diet largely of flesh there is an excess of nitrogen and this introduced into the system, goes on accumulating in uric acid compounds until its presence in the blood causes a high blood pressure and its deposition in the tissues and joints.

Faulty digestion does not necessarily mean an increase of uric acid, but it does mean other toxic conditions, the influence of which is often manifested in inflammatory attacks of the membranes of the upper air passages or some weakened parts of the mucous tracts.

Hence it follows that exposure to inclement weather, fatigue or mental worry, dietetic, sexual or alcoholic excesses, will suffice to precipitate a catarrhal attack by impairing digestion and favoring toxic infection. Were it not for these conditions the system would be able to withstand the attacks of most germs that are awaiting their opportunity to get into the tissues and the circulation.

My observations have led me to believe that one of the most common predisposing causes of a large per cent of the diseases that are met with in the nose and throat is associated if not largely due to uric acid or other toxic influence from faulty digestion.

We should classify our cases and study more carefully the influences that lead up to the various local lesions with which we have to deal, typical examples of which are found in naso-pharyngeal obstructions, causing impairment of the voice, sense of smell and hearing. The systemic condition

should receive at least an equal if not greater share of our attention. We should not content ourselves with the relief of local conditions only, but measures that are far reaching in their effects must be studied and judiciously applied.

While we feel assured that we possess a correct knowledge of the local lesion in a given case, still it is necessary to investigate every factor that may have contributed to the local disturbance. A patient's surroundings, his business and social relations, his mode of exercise and recreation, his habits of dress and care of skin, and more than all else, his diet and manner of eating should receive our careful attention. I am fully convinced that more of the ordinary ills of our American people can be laid at the door of our dietetic follies than any other cause.

We consume too much nitrogenous food; we eat too much meat, the auto-toxemic state that follows is quite sufficient to precipitate catarrhal attacks of the mucosa and glandular strictures of the upper air tracts. Many of the incipient cases that apply to us for treatment would get well without drugs or surgical interference with a rigid correction of diet, exercise and hygienic influences. I might cite many cases illustrative of the curative influence of first directing attention to the toxic and lithemic conditions, but will not presume upon your intelligence and further consume your time. I hope that these remarks may not be in vain, but may stimulate your renewed interest in investigation and practice along the lines here indicated which will, if carried out, in many instances obviate the necessity of the more radical use of caustics, the cautery and cutting instruments, in the early stages of a large group of cases.

Willoughby Building.

XXXI.

CASE OF REMOVAL OF COCHLEA AND SEMICIRCULAR CANALS.—RECOVERY.

BY R. L. CULBERTSON, M. D.,

ZANESVILLE, OHIO.

Mr. H. N. (Greek), age 22 years, consulted me Nov. 9, 1902. He stated that two months previous he took cold and had pain in the left ear. Soon after the ear "broke" and discharged but there was no pain back of the ear.

At that time he was in Buffalo, N. Y.; his otologist used ice applications on the mastoid. After remaining in Buffalo four or five weeks he came to Zanesville and consulted another otologist who continued ice applications several weeks and used leeches also.

He then consulted the writer who decided that the case was one of severe mastoid disease. Temperature 100°. The day following I performed a Stacke-Schwartz operation, finding the cells shallow and much diseased, and the ossicles entirely necrosed, I removed all of antral cells, all mastoid cells and a small portion of inner plate of mastoid, and a small portion of necrosed bone from about the facial nerve. No paralysis followed.

I used an electric battery, one pole being placed in the neck and a small curved needle attached to the other pole. The needle was run carefully over the course of the facial nerve and when it would come in contact with the nerve the face would jerk. This assisted in preventing injury to the facial. I do not know if this has been used heretofore. I would suggest that the curett be connected with the battery and thus show when facial is in danger.

Nov. 12, temperature 100. Dressing removed Nov. 13, temperature 99. Nov. 19, temperature 99 1-5.

Nov. 20, Operated again and removed all the tip and all

the inner plate of mastoid; all bone over lateral and transverse sinus as far as occipital bone; portion of bone over the temporal lobe about the size of a silver half dollar; also zygomatic cells and part of bone from around facial, slightly injuring facial (recovered from this in a few days).

Nov. 21, temperature 99 1-5; Nov. 29, temperature 98 2-5; Dec. 1, 2, 3, 4, 5, 6 temperature normal. Healing was rapid, though there were some redundant granulations which I touched with very strong solution of nitrate of silver. Temperature continued normal for some time but there was still a purulent discharge and I concluded that there was necrosed bone beneath the healthy granulations, although the temperature was normal. Patient complained of sounds in ear like locomotives whistling and blowing off steam, birds singing, etc. Also extreme dizziness causing him to grasp something to keep from falling.

Dec. 21. Operated again, removed nearly all the tegmen tympani, also all the cochlea and semicircular canals and diseased bone from around them (all cells in this region were removed), removed all the bone from around facial as it was diseased throughout the path of the canal excepting the portion in the tegmen tympani; facial nerve was cut as this was unavoidable in this case. Bone over carotid canal found to be healthy. Portion of petrous bone, back of canals and next cerebellum, removed as far as internal aspect of internal auditory canal, all bone between lateral sinus and Fallopiian canal removed and portion over jugular bulb, bulb high-placed, vaginal process scraped. Slight injury to sinus and jugular at bulb. This was tightly plugged and all hemorrhage arrested, and wound dressed with iodoform and stearate of zinc and iodoform gauze.

Dec. 23, temperature 101 1-2. Dec. 25, removed dressing and plugs. No hemorrhage, wound looked well. Dec. 26, temperature normal; no dizziness, no nystagmus; eyes not turned to left; patient sat up in bed.

Dec. 30, temperature normal; no dizziness, no nystagmus; wound granulating nicely.

Jan. 5, temperature 99. Jan. 8, normal temperature. No fever after this. Jan. 25, bone all covered with granulation.

Walks normally; no dizziness. March 20, case discharged cured. Facial paralysis slightly improved.

CASE II. Removal of cochlea, the semi-circular canals remaining. Sister M. De C., age 21, referred by Dr. Sutton of this city, presenting a well marked case of mastoid disease resulting from influenza.

July 22, 1901, operated and found lower cells of mastoid healthy and cells very shallow. Disease located in antral cells and cavity of tympanum. Malleus and incus removed as they were diseased. Stacke-Scawartze operation performed.

July 28, temperature normal; Aug. 10 temp. 99 4-5; very offensive pus discharge, patient very dizzy.

Aug. 15 no improvement.

Aug. 16, opened all mastoid cells; no disease below; found few more diseased cells in antrum and tegmen tympani; found cochlea badly increased and removed it entire; semi-circular canals normal, removed small portion increased bone from over facial. Facial not improved (used electric battery inlocating facial).

Aug. 20, temperature normal; dry dressing; wound slowly granulated and some offensive discharge for several months due to escape of labyrinthine fluid which formed an excellent medium growth of germs. This gradually ceased and wound closed and she made a complete recovery save that she was totally deaf in that ear.

XXXII.

GENERAL SEPTIC INFECTION OF NASAL ORIGIN.*

BY A. LOGAN TURNER, M. D. (EDIN), F. R. C. S. ED.,

LECTURER ON DISEASES OF THE THROAT, NOSE AND EAR,
SCHOOL OF MEDICINE, EDINBURGH.

Although the subject suggested by the above title cannot be regarded as a new one, it is one of very considerable practical importance. The possibility of general septic infection arising from an intranasal lesion may very naturally be overlooked. That a type of illness presenting a train of symptoms, and indeed simulating a grave pathological condition, may have its origin in some simple affection of the nasal chambers, has already been described. So insignificant, indeed, may be the nasal lesion, that the patient remains unaware of it, and his physician's attention may possibly be only directed to it accidentally. The similarity of the symptoms in one case to those of ague, in another to typhoid fever, and in a third to pulmonary phthisis, adds additional interest to the study of such cases. It is with the object of again drawing attention to the possible nasal origin of some of these obscure symptoms that the following cases are recorded:—

CASE 1.—Miss A., aet. 21, was seen, at the request of Sir John Tuke in consultation with Dr. George A. Gibson, at the end of June 1902. About six weeks before that date the patient had a sharp attack of influenza. This passed off but apparently she did not completely recover her usual state of health. During the succeeding four weeks, her temperature consistently showed an evening rise, and sometimes even in the morning it was above normal. In the evening, it would reach 101° or 102° F. She complained also of night sweating. Save for these symptoms and some indefinite pains in the back of the head, she was otherwise apparently in fairly good

*From Edinburgh Medical Journal, March, 1903.

health. The question of the possible existence of pulmonary phthisis naturally suggested itself, but more than one examination of the lungs failed to reveal any physical signs in the chest.

There was no cough, but in the morning the patient was able to bring up from the back of the nose and the throat a moderate quantity of purulent-looking secretion. She did not complain of any bad taste or fetid odor. An examination of the secretion, made in the Laboratory of The Royal College of Physicians, showed that there were no tubercle bacilli present. A culture which was made gave, however, a pure growth of staphylococci in twelve hours, while numerous other organisms could be detected microscopically. I was asked by Dr. Gibson to make an examination of the nose.

By anterior rhinoscopy, no pus was detected in either nasal cavity, nor did the dependent position of the head bring about any flow into the nose. Some muco-purulent secretion was visible in the naso-pharynx. The larynx appeared perfectly normal. Transillumination of the maxillary sinuses showed the left antrum to be opaque, while the right illuminated brightly. In order thoroughly to elucidate the case, it was decided to puncture and wash out the left antrum, because it presented such a distinct contrast to the right on transillumination. This was done through the outer wall of the inferior meatus, with a fine trochar and cannula. The result was negative, the lotion being returned perfectly free of secretion. Daily syringing of the nose was commenced, followed by the use of a menthol and parolein spray. The headaches disappeared and the temperature gradually fell to normal, without any irregular rise. The patient rapidly improved, and the discharge from the back of the nose gradually ceased. In the month of August she wrote to inform me that the nasal secretion was reduced to a minimum, and that she was practically well.

Dr. George Gibson has informed me of another case which he was asked to see. The patient was a lady whose condition more than one physician had pronounced to be tuberculous. Examination of the nose and throat led him to suspect these areas as the source of the infection. Suitable treatment was followed by disappearance of her symptoms.

CASE 2.—Miss B. was sent to me by Dr. Moorhouse of Sterling in May, 1902. He kindly furnished me with the following history of the case:—Five years before, she suffered from erysipelas of the face, and her present illness appeared to date from that time. At any rate, since her attack of erysipelas, she had always been “out of sorts and nervous,” afraid to go to church or attend public meeting of any kind. In September, 1902, however, fresh symptoms developed, and she began to suffer from chills, followed by a sweating and pyrexia. When examined by Dr. Moorhouse, nothing of a serious nature could be detected in the chest or in any of the internal organs. On questioning her more closely, he learnt that she complained of a nasal discharge, accompanied by an offensive smell. At the same time there was a considerable accumulation of secretion at the back of the nose and in the throat in the morning. At that time he concluded that she was suffering from a mild form of septicemia, in all probability due to the intranasal condition. Examination of the nose revealed nothing of an unusual nature. A nasal douche containing bicarbonate of soda and boracic acid was ordered to be used morning and evening, and very considerable improvement at once manifested itself, although some nasal discharge still continued. In November of the same year, she felt so much better that she submitted to the extraction of eight teeth. While she was under gas, the dentist perforated the left antral cavity through the socket of one of the molar teeth, but no pus was detected in that cavity. When seen by myself in May, 1902, she still complained of post-nasal discharge, and had a tendency to clear her throat. On examination, nothing was found to lead to a diagnosis of accessory sinus suppuration. There was no pus in either middle meatus, and both antra illuminated. Upon the floor of each nasal cavity there was some muco-purulent secretion. The nasal syringing was continued, and a spray of 5 per cent. protargol solution ordered.

I had a further opportunity of examining the patient in January of the present year; she expressed herself as being in better health than she had been during the last two or three years, and she no longer suffered from rise of temperature. There was still a little naso-pharyngeal catarrh present.

Both these cases are of undoubted clinical interest, and we are justified in concluding, when the result of treatment is considered, that both of these patients suffered from a mild form of septicemia with the source of infection in the nose and naso-pharynx. It is true that neither of them presented symptoms of a serious nature; nevertheless in both of them—especially the former—the symptoms were of a character to cause some anxiety as to the possible existence of tuberculosis. The importance of recognising a simple nasal lesion as the origin of symptoms which forcibly suggest the presence of phthisis, needs no comment. It is interesting to note, however, that in some of these obscure cases there may be an entire absence of any symptom or signs pointing to the presence of an intranasal affection. Not only may there be nothing to turn the physician's attention to the nose, but the patient himself may fail to recognize the fact that there is any abnormal condition of his upper respiratory passages. Hajek* records a case which affords a striking example of this. The patient was an educated man, who had on several occasions consulted eminent physicians regarding the state of his health. The chief symptoms complained of were general nervous irritability, and a tendency to become angered against his friends whom he most respected. He slept badly, his feet remained unusually cold, while the upper part of his body, especially his face, became congested and hot. His pulse beats were much accelerated, numbering, as a rule, from 130 to 134 per minute. At meals, the cardiac pulsations and congested state of the skin would cause him so much discomfort, that he was often obliged to leave the room. His heart and lungs had frequently been examined, but no evidence of disease had ever been detected. Apparently the patient had never complained to any of his medical advisers of his nose, and even when closely questioned by Hajek, before any examination had been made, he firmly maintained that he had nothing abnormal there. Puncture of the left antrum of Highmore and douching of the cavity was followed by the evacuation of a quantity of extremely foul-smelling pus. After the sinus had been opened and drained, all his symptoms entirely disappeared.

*"Path. u. Therap. der Entzünd. Erkrank. der Nebenhöhlen."

That the presence of a foul-smelling discharge may exist in the maxillary sinus, without the patient being in the least aware of the fact, I have had more than one opportunity of observing. In one case the fetor was so marked when the cavity was opened, that the bystanders were compelled to stand back, the fetor resembling that of a stinking abscess about the appendix. The patient expressed surprise afterward, that such a state of affairs could have existed. It is evident, therefore, that the physician may receive no assistance from his patient as regards the nasal origin of some of these cases of general septic infection.

Some years ago, Dr. William Carter* of Liverpool published a series of interesting cases of fever of a septic type, in which the origin of the malady remained for a long time obscure. One of Carter's patients was a medical man, living in a healthy seaside town, under conditions which were apparently thoroughly favorable, his house being a good one and well situated. Every day, about a half an hour after breakfast, he expectorated with some difficulty a little mucus, after which he was attacked by rigors which recurred daily and almost with the regularity of ague. He continued his professional work, although with much discomfort, while his axillary temperature was as high as 103° F. The persistence of this condition led him to suspect tuberculosis, but a careful examination of all his organs failed to reveal any physical signs. The only lesion that could be discovered was a catarrhal condition of the mucous membrane of the left nostril. He commenced irrigation of the nose with a strong solution of liquor sodae chlorinatae, and used a snuff of boracic and bismuth powder. Almost at once after the commencement of the local treatment, the elevation of temperature ceased, and his symptoms completely disappeared. In another of the cases reported by Carter the symptoms were of a more acute nature, and it is also the employment of antiseptics in the nasal cavities was followed by amelioration and finally cure of the conditions. In a third case, the symptoms from which the patient suffered suggested the existence of typhoid fever, but examination of the internal organs showed no evidence of this. A rhinoscopic examination, however, revealed the

*Lancet, London, 1895.

presence of a piece of necrosed bone. After radical measures had been resorted to, there was a final disappearance of the symptoms.

As examples of general septic infection occurring in fetid atrophic rhinitis, or ozena, one may cite the following examples, one reported by Permewan* of Liverpool, the other occurring in my own practice. In Permewan's case, symptoms of general malaise and loss of appetite were complained of. The daily temperature was always 100° F., rising in the evening to 102 or 103, while the pulse rate varied from 100 to 110 per minute. The source of the infection could not be established, until finally the patient acknowledged that for years his nose had given him considerable trouble, necessitating the frequent use of numerous handkerchiefs. There were intervals when he considered himself perfectly well, but recurrences took place. The nose and naso-pharynx were filled with offensive crusts. The removal of crusts and thorough irrigation of the nasal cavities, were followed by eminently satisfactory results, and at the end of three weeks of careful treatment the patient's general condition was excellent. The patient who came under my own care was a growing lad, who was in the habit of frequently using a thermometer of his own. He also suffered from fetid atrophic rhinitis, and on several occasions he reported the occurrence of rigors, with his temperature rising to 103° and even to 104° F., with periods of general malaise. The authenticity of this patient's own observations was proved, as on two occasions, while he remained under treatment in hospital, similar rigors were observed. The possibility of tuberculosis and of malaria was discussed, but both were excluded. Another interesting point in this case, and one which the patient himself was able to observe, was that if irrigation of the nose was not carried out in the morning, but delayed until midday, a rigor was not infrequently a sequel. It should be added that in this case pulmonary tuberculosis developed three years after the date of the above observations.

No one can gainsay the practical interest which lies in these cases, and which certainly point to the value of making an intranasal examination in septic conditions of doubtful origin. It is possible, too that a regular use of the thermometer might reveal more frequently the occurrence of general symptoms in septic conditions of the nasal cavities.

Liverpool Med. Chir. Journ., July, 1889.

XXXIII.

AN ADDITIONAL COMMUNICATION ON THE CAUSE AND SPECIFIC CURE OF HAY FEVER.*

BY DR. DUNBAR,

TRANSLATED BY CLARENCE LOEB, A. M., M. D., ST. LOUIS.

About a century ago, Bostock called attention to a disease which appears in our latitude every year about the end of May or beginning of June, which usually lasts about six to eight weeks, and which consists of a catarrh of the ocular, nasal and pharyngeal mucous membrane accompanied by sensations of tickling, itching, burning and heat. The nasal affection causes severe, long-lasting attacks of sneezing. In many patients there are also asthmatic attacks. These and other irritative symptoms on which we cannot dwell here, are so severe in many patients as to make it impossible for them to fulfill their daily duties during the time specified.

In literature this disease is often designated as "Bostock's catarrh," but many other names are assigned, according to the etiologic standpoint of the author. As a rule the name "hay fever" has been attached to the process, and although, as will be seen, this is not entirely etiologically correct, it is used in this article. Inasmuch as many thousands of patients have become accustomed to call themselves hay fever patients, it would be difficult to change the name.

In an article† which recently appeared the author discussed the different hypotheses and theories in regard to the cause of hay fever, and quoted the literature. He can therefore confine himself to refer, without quoting the literature, to the principal theories only so much as is necessary to understand the experiments which follow.

From the Deutsche Med. Wochenschrift, p. 149, No. 9, 1903.

† The Cause and Specific Treatment of Hay Fever. Munich and Berlin. R. Oldenbourg. 1903.

With few exceptions, the author argued that the disease of hay fever requires a certain individual predisposition, but that the recurrences of each attack was due, even in predisposed individuals, to the influence of an external exciting factor.

The early heat of summer, dust or other purely mechanical substances, emanations from grass or hay, and finally even micro-organisms have been suggested as this factor. For about 30 years the chief explanation has been that pollen excited the attacks of hay fever, based on the investigations of Elliotson and Blackley.

Later on, doubts arose as to the connection between pollen and hay fever, and the number of authors increased who denied that pollen caused the attacks of hay fever. At present the tendency is to regard hay fever as an infectious disease. Sticke expressed the present prevailing theory in the following words: "It was too little observed how advantageous, not to say necessary, was the supposition of a living infectious agent in the explanation of the typical course of hay fever when we neglected the theory and discovery of Helmholtz (who considered micro-organisms to be the cause of hay fever)."

The author, who for seven years has been investigating hay fever, started from the standpoint that it would be possible to arrive at correct conclusions in regard to the cause of hay fever, only if it were possible to separate the factor completely from the foreign elements, and by means of this factor, independent of temperature and meteorologic conditions, and at a time of the year different from the typical one, to cause all the symptoms of hay fever, and furthermore, if it were possible to prove that it attacks only such persons who suffer from hay fever and all others are immune to it.

He would like to state that the pollen of rye, barley, wheat, rice and corn, and all other graminous substances which cause symptoms of hay fever in those who are usually subject to hay fever attacks (for short hereafter to be called hay fever patients), are entirely innocuous to other persons. Furthermore, the grains of pollen of all other plants examined by him, among them the rose, linden, absinthe and many others which other authors claim are noxious, were

found to be without any action on hay fever patients.

By special experiments it was found, furthermore, that not only the mucous membrane of the hay fever patient which was supplied by the trigeminus reacted to the hay fever poison, as has lately been supposed, but the other mucous membranes also, e. g., that of the rectum.

By experiments made in December and January the author was able to demonstrate that the hay fever patients were sensitive to the hay fever poison not only in May, June and July, as Stecker thought, but at all other seasons of the year.

By treating the noxious pollen with ether and other chemicals, the author was able to show that its active principle was not the ethereal oleaginous constituent, as the early authors thought. The active principle was found to be completely insoluble in alcohol and ether and more or less easily soluble in water or saline solution according to the kind of grass; it was readily soluble in tears, nasal secretions, saliva and blood serum.

From the collected results of his experiments, the author is led to the conclusion that the active principle is represented by the starch bodies, which, by the way, are not composed of pure amyllum, which make up the chief constituent of the pollen grains. The active principle, probably contained in the so-called amyllum bodies, seems to be a kind of albuminous substance.

Only one of the numerous experiments, which will be found in full in the cited article, will be mentioned here as an example of how the solutions of the pollen grains affect the hay fever patients. 1/10 c.c. of a solution of pollen toxin in 1 c.c. of water was injected hypodermically in the forearm of a hay fever patient. One minute after the injection the patient had a sensation of dizziness; 15 minutes later he sneezed severely seven or eight times; 2 minutes later a spell of coughing appeared. This attack was similar to whooping-cough and, in the space of about one half hour, returned several times, at first lasting some time but later in short attacks of a few minutes' intervals. At the same time the patient had a raw, scratching feeling in the air passages. He said he felt as though he had inhaled sulphuric acid gas.

Simultaneously with the coughing appeared a discharge

from the nose. Both nasal passages swelled up in the space of a few minutes so that the air was absolutely unable to pass through.

The conjunctiva of both eyes was at this time injected and chemotic, and the eyes teared excessively. The gums itched so severely that he gritted his teeth. At the same time the face of the patient swelled and had a cyanotic color of such a degree that he could hardly be recognized. The bluish-red, discolored ears, especially, were very edematous. The veins of the face were very prominent. The patient felt a strong pressure in the ear. Examination of the ear showed a normal drum.

A quarter of an hour after the injection the patient was aphonic. Laryngeal examination revealed a great redness of the pharyngeal and laryngeal mucous membrane.

Meanwhile, the patient felt pain in the breast and simultaneously an audible inspiratory stridor appeared. Patient had the feeling of a beginning bronchitis. He coughed out a small amount of a thin, slimy expectoration. He then experienced an extraordinarily severe perspiration, so that the sweat poured from his forehead. The respirations were quickened (28-32 a minute) and made more difficult; the pulse rose to 92 (normally 68), while the temperature of the body was normal (36.8° C.).

Fifty minutes after the injection there was an itching over the entire body of the patient. Inspection revealed a superficial urticaria, with eruption over the entire body.

About four hours after the injection the patient felt somewhat better. The dyspnea, especially, had ceased. Still two hours later, a cough reappeared, as well as inspiratory stridor and a feeling of constriction in the breast. Although his temperature was normal, the patient had chilly sensations and a fullness in the head. The urticaria had somewhat disappeared, but a severe erythema was still visible. At this time, and even 24 hours later, the face was very edematous.

The following morning the patient had a feeling of weakness and disinclination for work. In walking and climbing stairs he felt a constriction and pain in the region of the heart, both of which he had never experienced, although accustomed to hard work.

At the place of injection, 20 minutes after it was made, appeared a hard, painless, very red spot, 5 cm. broad. It felt hot. This spot steadily increased in size. In the evening it reached from the elbow to the wrist of the affected arm. No depression remained on pressure. During the night a moist pack was used and the arm elevated. In the morning the swelling had increased to the metacarpal articulations. The circumference, 24 hours after the injection, was 29.5 (normally at this place 27). The swelling began to disappear on the second day after the injection, and had completely disappeared on the fifth day.

This amount of pollen toxin which had caused such a severe attack of hay fever in the case cited, was completely inert in the case of a person, a non-sufferer from hay fever, used for control, when the injection was likewise made in the arm.

The experiments were carried out on three hay fever patients and a number of control persons, under the most varied conditions. I must refer you to the original article for the details. In general, it may be said that all experiences invariably led to the same results irrespective of whether the pollen grains were inspired in their natural condition or their active principles were brought into the eye or nose in an active solution. In hay fever patients symptoms of hay fever always appeared. In others the application of the pollen grains or their active principles cause no irritative phenomena.

The author could rest his opinion that the irritative factor, the cause of hay fever, was to be sought in the contents of the grass pollen grains, at the time of his former publication, only in experiments carried out on three hay fever patients and a large number of other persons. In the meanwhile, through the courtesy of the presidents of the Heligoland Hay Fever Association, Drs. A. Thost and M. O. Schultz, he has had a chance to amplify his observations. The following deals with these observations.

The following experiences, which were carried out on Jan. 24th, of this year, deal with eight hay fever patients, two of whom were in the list of patients mentioned above, upon whom experiments had been carried out previously. The con-

trol experiment was made on the same day on fourteen persons who did not suffer from hay fever. Of these fourteen, three proved to be not suitable cases. One suffered from asthma verosum; the second claimed to suffer from attacks similar to hay fever during the entire year. Both cases will be more fully explained later. The third had to be excluded on account of an inflammation of the conjunctiva.

The pulverized pollen grains of corn, in a centrifugalized watery solution, containing many so-called starch bodies, was dropped into the conjunctival sac of each eye of the eight hay fever patients and eleven control patients. Dr. A. Thost, who is greatly interested in therapy of hay fever and who is well known, and read an excellent article before the Naturalist Society of Hamburg, kindly undertook the confirmation of the conditions found after the application of the poison.

These will be described in another place more fully. As the space is insufficient here, the observations will be summarized in brief.

Not one of the eleven control patients showed the least specific irritability toward the pollen toxin. Several felt a mild burning after the instillation of the drops. They however, felt the same subjective sensation, when the experiment was made with physiologic salt solution instead of the toxin. In not one did the slightest objective change appear. Even when the poison was applied in 20-fold strength and quantity, there was no irritative symptoms present in the control persons.

Quite the contrary was shown by the experiments on the hay fever patients. All of them reacted to application of the toxin, as well subjectively as with characteristic objective symptoms.

In the first place, each one felt the characteristic burning in the inner canthus, so well known to hay fever patients, and, later on, itching, feeling of warmth, and photophobia. One suffered with an attack of migraine, to which he is subject in the hay fever period; another, 48 hours after the infection, had a feeling of weariness in the infected eye.

Objectively they showed, a short time after the use of the toxin, a severe reddening of the caruncle, then of the margin

of the lids with injection of the conjunctival vessels, accompanied in some patients by an evident chemosis.

The intensity of both subjective as well as objective irritation varied considerable; in some they were very severe, even after very mild doses of the toxin, while in others they were mild or even very slight. But in no case did a clearly demonstrable reaction fail to accompany the subjective sensation.

I believe, judging from my experiences, that a considerable emphasis should be laid on the objective changes. For that reason, the investigations on the eye will be described here since they are more evident and more clearly demonstrable than the changes which the pollen toxin causes in the nasal cavities of hay fever patients. Furthermore, irritation appeared in several of the patients after a short time in the nasal cavity corresponding to the infected eye. In other patients, the toxin was also put in the nose with the invariable result that there at once appeared a severe swelling of the mucous membrane, and usually so rapidly that there was not time for paroxysms of sneezing. In one case, where only a small amount of toxin was used in the nose, there was a severe attack of sneezing.

Considering the complete coincidence of the results obtained, which were derived from 9 hay fever patients, and more than 20 control patients, it can be stated with much certainty THAT POLLEN TOXIN GIVES RISE TO CORRESPONDING SPECIFIC IRRITATIVE SYMPTOMS IN HAY FEVER PATIENTS, BUT IS COMPLETELY INERT IN CASES OF NORMAL PERSONS.

I cannot here dwell further on the possibility thus opened up, of obtaining an insight into the important question of individual predisposition. I can only refer to the practically weighty fact that this specific reaction of the hay fever patient to the pollen toxin will give us the power of sharp differentiation of hay fever from other similar diseases.

After it has shown that the contents of the pollen grains of the grains of the graminous plants were actually the substance which causes attacks of hay fever in such patients, on the 24th of January, as a complement to the experiments described above, experiments were made with an anti-toxin obtained by the author by injection of the contents of such grains in animals.

The injected animals had furnished for months a blood serum which not only did not neutralize the pollen toxin, but considerably increased its action on hay fever patients. These properties gradually receded into the background, and an antitoxic influence was unconsciously imparted. Even in my previously cited publication, I could report similar findings. On January 24th, all 8 patients, after the infection of their eyes by the pollen toxin had produced the symptoms described, had applied to the other eye the same amount of toxin, which, however, had previously been mixed in a glass with the antitoxic serum. The result was that 7 of the hay fever patients did not experience even the slightest reaction, either subjectively or objectively, to this injection. The 8 patients, who had shown a very great susceptibility to the toxin, experienced a very slight, and very transient itching in the eye treated with the mixture. In this eye, a slight reddening was also to be seen. This disappeared completely in a half hour, while the one, where the toxin without admixture of the antitoxin had been applied, was reddened even after the lapse of 24 hours, and after 48 hours still felt tired.

FROM THIS IT IS SEEN THAT IT WAS POSSIBLE COMPLETELY OR NEARLY COMPLETELY TO NEUTRALIZE THE POLLEN TOXIN BY MIXING WITH THE ANTITOXIN IN THE TEST TUBE.

Considering that in these experiments larger amounts of the toxins were used than those which infect one normally during the hay fever period, we may claim on the score of these last experiments that it will be possible to give soon the numerous hay fever patients the long-hoped for amelioration of their period of suffering.

There is no doubt that it will be possible to manufacture a much more powerful antitoxin than the author had at his disposal. But even with this, the author could bring about cures in the eye and the nose, as the following thoroughly satisfactory results show:

A drop of a very powerful pollen toxin was instilled into an eye. As soon as the caruncle was very red, and the patient experienced a decided burning, a drop of antitoxin was brought into the eye by means of a dropper. The burning

ceased immediately, but was felt again a few moments later. A second drop of the antitoxin was used with the same result viz: that the burning ceased immediately, but soon returned. After four drops had been applied within 20 minutes, the subjective symptoms completely disappeared, as did the above mentioned objective changes in the caruncle. There never was an injection of the conjunctival vessels. The application of the antitoxin could be made without any help, and could be done at any time and all circumstances. In applications to the nose, the course was similar, only the beneficial effects were still more striking, because larger amounts of the antitoxin could be absorbed in the nasal cavities than in the eye.

Thus, there seems to be a well grounded hope of attacking the hay fever by simple external application of the antitoxin, provided this is applied early. As soon, however, as large quantities of the poison are absorbed, the effect will hardly be obtained otherwise than through subcutaneous injection.

The question as to whether it will be possible to prepare a serum, one injection of which would be sufficient to immunize hay fever patients for a long time against this disease, cannot be answered just yet, nor can even the possibility of an active immunity against hay fever be discussed any further now.

In all the above experiments, the toxic symptoms were caused by pollen toxin obtained from the pollen of Indian corn. The antitoxin was also obtained from this plant. The author has remarked, above, that the pollen grains of all the grasses examined by him (18 kinds, in all) act the same way on patients. The question of whether the pollen toxin of the different grasses are identical is very important. A practical, specific agent against hay fever could be found only in such a case. By the proper experiments, the author can prove that the toxin obtained from the pollen of rye is completely neutralized in the test tube by antitoxin obtained from the pollen of corn; and, furthermore, the subjective irritative symptoms caused in a patient by the toxin of the pollen of rye are completely cured by the antitoxin obtained from corn. It thus seems very probable that the pollen toxin of the different grasses are identical.

Additional experiments have been commenced to decide this very important, practical question.

I am deeply indebted to Dr. W. Weichardt for his zealous assistance in carrying out the above experiments.

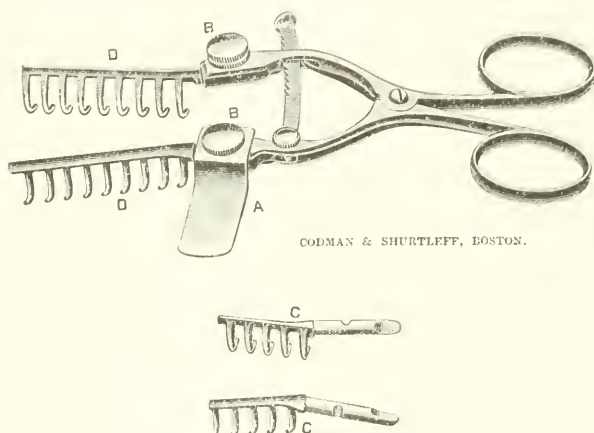
XXXIV.

A MASTOID AND AURICLE RETRACTOR.*

BY FREDERICK L. JACK, M. D., BOSTON.

The mastoid part of this instrument is a modification of Allport's retractor and Jansen's mouthgag. The additional simple device to hold the auricle is thought to be new. The following cut illustrates the many advantages of the instrument:

There are three sets of blades, varying in length to fit different lengths of incision. Two sets only are recommended. The teeth are placed close together and, with the blades in



position, the edges of the wound are widely separated so as not only to afford sufficient room for operating, but to control hemorrhage. The handles are pressed together, like those of scissors, and held in place by a ratchet. The instrument is quickly adjusted and absolutely self retaining.

The auricle, which is often in the field of operation, requiring an assistant to hold it well forward out of the operative field, is now perfectly held aside by means of the ear-tip (A). The tip is simply a thin piece of metal adjusted to a groove in the head of screws (B). Both heads are grooved so that it can be readily used for the right or left ear. After the retractor is in place, the upper half of the auricle is folded over and held in place by adjusting the tip in the groove.

The instrument has been carefully made by Codman & Shurtleff, Boston.

*Read before the American Otological Society, Washington, D. C., May 13, 1903.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINO- LOGIC AND LARYNGOLOGIC LITERATURE.

I.— EAR.

Ossiculectomy for Chronic Suppurative Otitis Media.

MAX TOEPLITZ. (*Archives of Otolaryngology*, Vol. XXXII, No. 1, 1903.) CASE I: A boy who had been operated on a year ago at the Montefiore Home, who had had a running from the right ear with considerable odor for several years. There was perforation and the use of the probe in the attic showed considerable grating. There was some hesitation as to whether the operation should be the radical operation or ossiculectomy, but the latter was finally deemed more advisable and was performed. The ossicles on removal were found carious. After operation the otorrhea and odor ceased and the boy appeared well. He passed from observation and has since not been seen until quite recently. At present there are some odor and a few granulations on the posterior wall of the meatus. It was considered probable that a radical operation would have to be done in this case.

The second case was in a child, aged eight years, operated on four weeks ago at the Post-Graduate Hospital; giving the history of continuous discharge for six years, much odor, and examination with the probe revealed grating in the attic. The ossicles were removed, the incus was normal, and the malleus was carious. Discharge and odor ceased, the ear is now perfectly dry, and the general health of the patient improved.

The question seemed to be as to when the ossicles should be removed and when not. Dr. Toeplitz thought that if diagnosis could confine the disease to the middle ear an ossiculectomy would be sufficient, but inasmuch as other parts were often involved, and as this was only to be ascertained by free exposure, the question still remained. He considered it wiser to make an ossiculectomy as a preliminary, followed

later by the radical operation if the discharge did not cease, and gave as his experience in twenty cases only one in which the second operation was required.

Another important point he brought up was as to what promises could be made with regard to hearing after operation. He cited a case seen in consultation in which other physicians had promised improvement; he was not so hopeful, and as the case turned out the hearing was worse after than before operation. He was in favor of a guarded prognosis.

Absolute Occlusion of the External Auditory Canal from an Exostosis and Ecchondrosis from the Anterior Wall of the Canal.

MEIERHOF. (*Archives of Otology*, Vol. XXXII, No. 1, 1903.) According to tests the ear seems normal, sound conduction is good, and some hearing is present. He has hesitated about rendering the canal patent by operating, but the patient now complains of neuralgia radiating from that side of the head. He has not been able to determine whether or not operation is advisable, owing to the unknown depth of the exostosis and possibility of completing the operation so as to have a successful result.

Sinus Thrombosis, Followed by Hypoglossal Paralysis.

CARL KOLLER. (*Archives of Otology*, Vol. XXXII, No. 1, 1903.) A girl, G. S., twenty-one years old, was admitted to the Mt. Sinai Hospital June 30, 1902. For two weeks she had, after some tonsillitis, been suffering with pain in the left ear, general headache, and high fever with chilly sensations. Four days later paracentesis of the left drum was made in the dispensary; no pus. On admission some tenderness was found over the mastoid tip and antrum and over the posterior part of the mastoid. Pronounced tenderness along the upper course of the jugular. Wry-neck of moderate degree. The drum was not thickened but of a pale greenish color, as if a green exudate adhered to it on the inner side. No discharge. The fundus in both eyes showed marked venous congestion. On the next day this has pro-

gressed so much as to leave no doubt about papillitis developing.

Operation July 1st.—Preliminary paracentesis; considerable discharge. After the first removal of bone a minute quantity of pus was found. Sinus was accordingly opened, its wall being exceedingly thin. It was situated very superficially and well forward, overlapping the antrum. It bled freely. It was exposed for about one inch; it was blue in color, narrow and bulged considerably. Some granulations were found in the antrum and the posterior cells; those of the tip were free of pus or granulations. Iodoform gauze dressing. The subsequent course was that, after a short intermission, the temperature continued septic in character. Patient complained of severe headache in the left side and occiput, and extreme tenderness in the upper course of the jugular. Papillitis increased visibly so as to deserve the name of choked disc. Blood culture sterile.

Operation on July 11th.—(1) Curettage of sigmoid sinus; (2) ligature and excision of the jugular. The dura mater of the median fossa was exposed over the tegmen tympani and antri; it did not bulge and appear normal. Then the sinus was exposed in its entire length, going as near as possible toward the bulb. It was thrombosed. Upon curetting it bled freely from above, but the bleeding from the region of the bulb was not satisfactory. Then the jugular was tied and dissected as high up as possible; about 1 1/2 inches of it were excised. It was not thrombosed. A culture of the thrombus found in the sinus was sterile. Temperature in the next days ranged somewhat over 102°. Some tenderness over the wound in the neck and in the upper part of the posterior cervical triangle. On July 14th the patient complained of severe pain in the head and pain on swallowing. The general condition was not so good, the patient being weaker and paler. On July 16th, gauze packing was removed from the sinus, and from its lower end some pus escaped with distinct pulsation. A rubber tissue drain was introduced toward the bulb and kept in that position. From now on till July 27th the temperature was almost normal, there was no pain, and the general condition was very good. On July 27th the temperature rose again, and from now on kept intermittent; patient

began again to complain of severe headache. No pus came from the sinus from the direction of the bulb. A tender diffuse swelling appeared in the upper third of the posterior cervical triangle. A communication existed between this swelling and the jugular bulb, for on pressing upon the swelling pus escaped from the lower part of the sinus. On August 4th, the deep abscess situated between the deeper muscles of the neck and near the base of the occiput was opened and drained. With the probe one could feel a spot of the occipital bone near the condyles denuded. However, fever and pain continued. The presence of another abscess near the bulb of the jugular was decided on, and on August 14th this second abscess was searched for and found at very great depth. It was reached from behind after having tried in vain to reach the bulb of the jugular through the old wound in the neck. On August 16th, two days after the last operation, it was noticed that the tongue, when protruded, deviated to the left. On the next day the complete symptoms of hypoglossal paralysis were present on the left side. Besides, patient complained of difficulty in swallowing. When the sense of taste was examined it was found diminished in the posterior third of the left side. Temperature remained high. The discharge of pus was very profuse for a few days, then it stopped almost suddenly about one week after the last operation. Temperature became and remained normal and the patient made a quick recovery. The papillitis cleared up gradually; however, it took many weeks to disappear. The hypoglossal paralysis improved more slowly, and traces of both can be recognized to this day.

In discussing the case, which in many particulars differs from the typical picture of thrombophlebitis of the sigmoid sinus, Dr. Koller wished to say from the beginning that it most likely was a case of primary phlebitis of the jugular bulb. This class of cases has been lately brought into prominence by Jansen and others. The mechanism of infection is not quite apparent yet, but the shortest route would suggest itself as the most likely and that would be directly from the tympanic cavity to the bulb of the jugular, which lies in so close proximity. Perhaps congenital peculiarities would predispose an individual to this danger. The patient

exhibited rapidly developing papillitis which does not belong to the typical symptoms of thrombosis of the sigmoid sinus, although it is regularly met with in the thrombosis of the cavernous sinus. But, according to Jansen's statements, papillitis is a common occurrence in the cases of primary phlebitis of the jugular bulb. The conditions revealed by the first operation agree fully with that view taken of the case. The abscess in the bulb must have perforated and burrowed under the deep muscles of the neck until it appeared in the upper part of the posterior cervical triangle. Macewen gives another explanation of these deep abscesses. He states that they owe their origin to phlebitis of the condyloid emissary veins. However this may be, recovery did not take place until a second abscess, which was deeper yet and which was evidently the original periphlebitic abscess, had been opened and drained. There are a number of unusual symptoms connected with the case. Wry-neck is sometimes found in cases of thrombosis of the jugular, and the explanation given by Koerner and others is that, the movements of the head toward the other side being painful, the head is instinctively held as in wry-neck to ward off pain. It is hard to understand why this symptom should occur only in a comparatively small number of these cases. At different times in the history of this case presented there was noted difficulty in swallowing. A few days after the last operation the disturbed sensation of taste and motility of the tongue made their appearance, proving paralysis of the glosso-pharyngeal and hypoglossal nerves on the the left side. It is not impossible that this may have been due to injury, although Dr. Koller felt pretty sure this was not the case. Considering that the function of all three nerves, the ninth, tenth, and eleventh, leaving the skull through the jugular foramen in close proximity to the jugular bulb, was disturbed, and that the twelfth, leaving through the condyloid foramen, was paralyzed, it may not be too far-fetched to assume that the periphlebitic abscess was responsible for it, just in the same way as we sometimes see facial paralysis in cases of mastoiditis.

Sinus Thrombosis.

BRANDEGEE. (*Arch. Otol.*, Vol. XXXII, No. 1.) A patient

fifty-five years of age, five weeks ago came to the infirmary with ear trouble of ten days' standing. Temperature was 102°. At operation an abscess was found in the antrum and the sinus was unusually prominent. On exposure it appeared very black and was excised. A parietal clot was evacuated and bleeding restored from both sides. The temperature remained up on the second day. On the third day it came down only to go up again without any chill. It was then decided to operate in the neck and the jugular vein was exposed. It seemed normal except the portion from the facial junction upward where it contained a clot. The entire vein was resected and staphylococci were found in the walls. The patient made an uninterrupted recovery; the temperature after the second operation did not go up.

**Chronic Suppurative Otitis Augmented by a Blow Followed
by Symptoms of Mastoid Infection and Jugular
Thrombosis.**

LEDERMAN. (*Arch. Otol.*, Vol. XXXII, No. 1.) The usual operation was done, the mastoid opened, and carious tissue and pus removed; sinus thrombosed; the jugular was then tied one inch above the clavicle and a portion was resected. The tributaries were not ligated. The sinus was then opened and scraped. The parts were then curetted and the patient was in good condition. All went well for about five days, when chill and high temperature developed, and pus was found in the lower portion of the sinus wound. The wound was opened, but no pus was found, and it was concluded that the parts drained through the antrum. In five more days the temperature again rose; then it was found that the posterior sinus wound was infected. An inch and a half of bone was chiselled away, and the wound curetted till good return of blood was obtained. The patient did well and was shown as cured. For five months he was all right, when the ear began to discharge and a little granulation tissue and a portion of the incus were found to be present in the middle ear. These were removed under cocain. Three months ago the patient returned with a little fistula in the scar over the mastoid which led into the antrum. Probing disclosed bare bone. The Schwartze-Stacke operation was done, and the

result up to the present time is good. However, there was marked facial paralysis, which has slowly improved. The case is somewhat remarkable for the number of serious operations undergone. Dr. Lederman also thought the case illustrated the necessity of exercising great care in the thorough removal of all diseased tissue. He asked the opinion of the members of the Section as to the chance of complete recovery from the facial paralysis. The whole cavity has healed over, though the last operation was performed two months ago, and no sign of suppuration is present, though moisture occasionally comes through the Eustachian tube.

Thrombosis of the Jugular Bulb and Very Severe Pyemia.

ARNOLD KNAPP. (*Arch.Otol.*, Vol. XXXII, No. 1.) The patient was a man, twenty years of age, who had been under treatment for a mastoid fistula and external otitis when he suddenly became very ill with headache, vomiting, and great prostration. Temperature was 105.6°; pulse 130. On the following day the antrum was exposed containing granulations and pus. The tympanum was also laid bare and contained granulations. On removing the tegmen antri healthy dura was revealed. As the bone directly posterior to the antrum was honeycombed with pus, the operation was extended in this direction and some free pus was found on the surface of the sigmoid sulcus. The sinus in this region was covered with apparently healthy granulations; lower down it was normal and soft. Puncture in two places gave fluid blood. Two days later, as the pyemic temperature remained, the jugular vein was ligated. The ligation was somewhat difficult on account of the presence of enlarged cervical glands. The vein itself was found perfectly normal. The sinus was also exposed as low as possible and on being incised contained fluid blood. Notwithstanding these two operations the patient proceeded to go through a pyemia of nine weeks' duration. The greatest variation in temperature was 13°, going from 108.8° in one evening to 95° the next morning. Metastatic abscesses were formed in the subcutaneous tissues of the fore arms and legs, and in the deep cellular tissue beneath recti insertion just above the symphysis, the

latter focus in turn involving the perineum, the testicle, and adjoining areas of the thigh. On the whole, the patient was anesthetized seven times. There were very few chills. There was no apparent lung involvement and no diarrhea. Optic neuritis was present. The sensorium throughout this entire period was free and the nourishment was always well taken. Owing to the poor condition of the patient the ear wound was allowed to take care of itself; in other words, no attempt was made to tampon the tympanum and consequently the entire area filled with granulations and is covered with epithelium.

Specimen of an Unusually Distended Sigmoid Sinus and Jugular Bulb Obtained From a Patient who had Died of Meningitis.

ARNOLD KNAPP. (*Arch. of Otol.*, Vol. XXXII, No. 1.) The case has been described in extenso in the Archives of Otolology, Vol. XXX, No. 5. The peculiarity of the sinus was that it presented an unusually distended condition and that the anterior wall was normal while the posterior was infiltrated and very much thickened, and on its surface contained necrotic tissue. There was no thrombus found at autopsy.

A Hammer and Incus found Lying Loose in the Attic.

DENCH. (*Arch. of Otol.*, Vol. XXXII, No. 1.) Specimen came from a patient on whom he had performed the radical mastoid operation some ten days ago. The hammer and incus were tightly bound together and enveloped in a mass of granulation tissue. He thought this was interesting from several standpoints: first, that it was unusual to find the two ossicles bound together; second, that it shows the disease was limited to the attic. He said the case was one of recurrent mastoiditis apparently, and he found that the mastoid was very little involved and that there was a good deal of softening near the tympanic vault. The ordinary radical operation was completed, a Panse flap made, and the posterior wound left open. Dr. Dench said that very many of these cases of recurrent mastoiditis are really exacerbations of a chronic otitis, and that we should, in these cases, be prepared to do a radical operation inasmuch as the mastoid

operation, though relieving the symptoms of the patient, would not be followed by cure.

Malignant Disease in the Neighborhood of the Right Eustachian Tube.

WAGGETT. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient was a man of strong physique, complaining of pain and tinnitus in the right ear, of two months' duration. Nose and throat symptoms completely absent. The drum membrane of the right ear was remarkably retracted and its vessels injected. The right Eustachian eminence was involved in a firm, infiltrating new growth, which extended behind the posterior wall of the naso-pharynx on the right side. The whole mass was not much larger than the yolk of an egg. The history, evidence and result of antisppecific treatment negatived the probability of syphilis.

The Contagiousness of Acute Otitis Media.

WOLFF, Frankfort on the Main. (*Archives of Otology*, Vol. XXXII, No. 2.) The author takes issue with Lermoyez who claims that acute otitis media can be transmitted from one to another. Cases cited all appear to be due to an influenza infection, and in times of epidemic one not infrequently sees otitis begin without any other symptom of an infectious attack, although it is nothing more than a secondary infection.
Campbell.

Entotic Murmur due to Aneurism of the Occipital Artery.

MUCK, Rostock. (*Archives of Otology*, Vol. XXXII, No. 2.) The patient, aged 68, had for three months been conscious of a continuous pulsatile beating in her ear, which has become so intense as to disturb sleep. On examination a lobular pulsating tumor, streaked under the skin and extending from the mastoid process to within 2 cm. of the occipital protuberance. Pressure at the anterior lower corner corresponding to the place where the occipital artery becomes superficial, prevents pulsation in the entire tumor. Hearing normal on both sides. The sac was dissected out, and although the subjective aural symptoms completely disappeared

yet pulsation could still be felt over an area 2 cm. in diameter.

Campbell.

The Masto-Squamosal Suture.

ADERMAN, Orebro, Sweden. (*Archives of Otology*, Vol. XXXII, No. 2.) The author has examined skulls of various races and has not been able to find any particular difference as to the frequency of the suture, with the exception of the negro. In 79 negro skulls examined, 76 were completely without sutures.

In all, 5138 mastoid processes were examined, and 1806 had sutures. Of these 64 were well developed, 845 were easily recognizable and 951 presented traces. *Campbell.*

Acute Mastoiditis Complicated by Scleroderma.

KAMM, Breslau, (*Archives of Otology*, Vol. XXXII, No. 2.) In a case of acute middle ear suppuration pain set in behind the ear. The Mt. was perforated in the upper anterior quadrant and was red, thickened and bulging. The skin below the painful mastoid was thickened and hard. Examination showed the skin of the neck of the other side, and in fact, that of the whole body except abdomen and buttocks had the same board-like consistence. It was a case of diffuse scleroderma.

The Mt. wound was enlarged downward and backward, but the mastoid trouble persisting the bone was opened and freed of necrosed bone and granulation tissue. Incision through the skin gave rise to a marked venous hemorrhage.

Campbell.

Therapy of Otitis Media Suppurativa Chronica.

LEE WALLACE DEAN, Iowa City, Iowa. (*Amer. Medicine*, Jan. 17, 1903.) The various medicinal and cleansing measures in common use for the relief of this condition are considered somewhat in detail. The question of ossiculectomy is considered, and statistics given. The author himself regards the radical operation as the most satisfactory treatment for chronic suppuration, and considers the danger of the operation as very small. Healing results in one to four weeks. The mortality from the operation varies greatly,

being mostly from extraneous causes, few if any deaths being ascribable to the intervention. This is the only procedure by which a large amount of dead bone can be removed from the middle ear; and more deaths have occurred from not operating than as the result of unnecessary operations.

He does not consider it wise to treat the majority of the patients for more than two months before operating. Necrotic areas in the middle ear, shown by roughness of the bone under the probe, and the inability to pass the probe into the mastoid antrum, indicate the advisability of the radical operation. If there is only roughness of the long process of the hammer, its extraction may be sufficient. Polypoid growths should be removed and their bases cauterized. Many cases in which there is simply a collection of dead cells and pus in the middle ear will heal in one or two weeks under simple cleansing measures. If there is hypertrophy of the mucous membrane the discharge will usually reappear whenever the patient is exposed to cold.

Richards.

A Case of Mastoiditis with Features of Osteomyelitis.

H. KNAPP, NEW YORK: Patient, a frail, anemic woman, aet. 34, in the 8th month of pregnancy. Symptoms: pain in mastoid region three weeks, then headache, nausea, insomnia. Neither earache nor otorrhea. Hearing the same as in the other, well ear. Tympanic membranes normal; Shrapnell red and somewhat bulging. Mastoid process enlarged, dull red, hard; tender or doughy at the posterior border and red in the adjacent part of the occipital. Fever at times and also some chills. The enlargement of the mastoid, with almost normal tympanum suggest mastoid osteomyelitis. The mastoid is opened from tip to base. Pus in antrum, diploic structure of its interior. Disseminated small abscesses scattered through the whole apophysis, connecting with one another by slender passageways through the hardening bones. The mastoid was cleaned out as well, except the lower border of the adjacent medial wall. In six weeks swelling behind the mastoid. Second operation: Removal of the bony remnants of the mastoid tip. Splitting of the muscles in the suboccipital area. Arterial hemorrhage (oc-

cipital artery) stopped by compression. Turbid liquid and a good deal of pus evacuated. Large piece of carious occipital bone removed. Dura of cerebellum exposed extensively; healthy. Tamponing. Suppuration protracted six weeks. Stopped after removal of another piece of carious bone of occipital. Recovery with depressed scar. Ear healthy; in hearing as good as before and as good as the other ear.

Author's Abstract.

Abscess of Left Temporo-Sphenoidal Lobe. Operation. Recovery.

E. GRUENING. The patient, a boy thirteen years old, presented himself at the Mt. Sinai Hospital, on April 15, 1903, with a temperature of 102°. He had been sick for four weeks; had had a discharge from both ears for six years. The right ear was quiescent, the left was discharging fetid pus and cholesteatomatous masses. The mastoid region was red, edematous and tender to pressure. Shortly after admission he had a severe headache on the left side, with a chill and temperature 102°. A radical mastoid operation was performed, extensive caries was found, the upper-posterior bony wall of the external auditory canal had been destroyed by necrosis. The malleus and incus were absent, and the antrum, much larger than usual, was found filled with cholesteomatous masses. The tegmen of the antrum was carious and the dura mater was covered with granulations. The wound was dressed in the usual manner, and the patient did well. Eight days after the operation the patient vomited and had severe headache on the affected side. His temperature remained normal, but the pulse ranged from 48 to 54. Examination of eyes: The papillae were swollen, presenting the appearance of a neuro-retinitis. The next day (April 25) the symptoms were more pronounced, but there were no localizing symptoms and no sensory aphasia.

The wound was reopened, and under antiseptic precautions the dura was exposed over the roof of the antrum, beneath the temporal ridge and part of the squama. No fistula was found in the dura, but there was a marked discoloration over the antrum. The dura was punctured with an as-

pirating needle through the discolored spot. After the needle had perforated one inch, a syringe of fetid pus was withdrawn. Crucial incision was made through the dura, which permitted evacuation of about two ounces of pus. The finger was introduced and a large abscess cavity found. The wound in the brain was enlarged with forceps and packed with strips of gauze. This gauze was about one-half inch broad and had a selva on both edges to prevent raveling. Immediately following the evacuation of pus, the pulse rate rose to 100. The day following the operation the patient developed sensory aphasia, but felt better. The wound was dressed and pus and a considerable quantity of serum followed the removal of the dressing. On the two succeeding days, pus and serum exuded on removal of dressing. Since that time patient had made an uninterrupted recovery. The mastoid wound is nearly healed. The patient has no other symptoms than the optic neuritis, which still persists.

Author's Abstract.

Cerebellar Abscess.

E. GRUENING. The patient (B. S.), schoolgirl, age 10.

Admitted to Mt. Sinai Hospital, with history of severe headache, chills, fever. Vomiting, a purulent discharge from left ear for past five days. A slight discharge from the right ear.

Surgical Examination—Left Ear: Drum swollen, red. Small perforation. Mastoid red, tender, swollen.

Right Ear: Drum red, swollen, no perforation. Mastoid, somewhat tender.

The patient is drowsy when left alone.

Examination of Eye, negative.

Temperature, 102.8 deg. — 104.8 deg.

Pulse, 108 — 110

Operation: Radical mastoid on left side. Mastoid cells found carious. Antrum readily exposed; contained mucus and granulation. Sinus exposed for one-half inch (no pulsation). Thorough removal of diseased parts, and through irrigation, dry iodoform dressing.

Patient did well. Discharge from non operated right ear

ceased. Mastoid wound healthy; granulating. Temperature was reduced to 99.4°, and pulse to 88.

Two weeks after operation, patient complained of frontal headache—vomited. No rise of temperature. Mastoid wound looking well.

Right ear: Negative. Eyes: Negative.

The vomiting persisting, patient again drowsy, a secondary operation was done, consisting of:

Thorough cleaning out of middle ear. Exposure of dura; multiple exploratory puncture of brain with aspiration. Exploratory puncture in all directions and inward for 2 to 3 inches. Negative. Sinus covered by healthy granulations. Patient again improved.

Five days later, however, patient again vomited. Now pulse retarded to between 60 and 80 and 68. Right pupil larger than the left. No aphasia, no localized symptoms.

The patient continued drowsy, with headache, vomiting. Pulse at 60.

A further exploration of operation field was done. Tip of temporal lobe, sinus knee and the cerebellum were exposed.

Dura normal. No bulging.

Sinus normal.

Repeated puncture in all directions (including posteriorly toward occipital lobe), negative. Aspirations of cerebellum, negative.

May 3. (Three days later) Left facial paralysis developed. (Deviation of tongue, drooping of left angle of mouth).

May 5. Involuntary urination. Kernig sign present. Continues drowsy. Mentality good when aroused. A general tonic convulsion (of three minute duration) with dilated pupils. Breathing slow, stertorous, pulse imperceptible, vomiting immediately after.

May 6. Optic neuritis. Not easily aroused, facial paralysis persists. Kernig sign persists. Respirations drop to 8, and pulse very weak.

May 7. Another convulsion, after which respiration drops to 3. Pulse only fair. Artificial respiration. Put on operating table for final attempt to locate the abscess. Multiple exploratory puncture of left cerebellum and cerebrum. Negative.

Exitus at 5:35 p. m.

Report of Post Mortem:—

In right cerebellar hemisphere, near upper surface of lobus clivi and extending posteriorly almost to the sulcus clivalis was found an abscess cavity the size of a walnut, filled with greyish red pus (no odor), surrounded by a distinct pyogenic membrane of the same color (very fibrinous). The surrounding brain tissue was negative.

Culture from Abscess: Streptococci,

Author's Abstract.

A Valuable Apparatus for Use in Insufflation of Air in Diseases of the Ear.

LUCAE, A., (*Deutsche Med. Woch.*, 1903, No. 11), has made the carbon dioxide gas apparatus, which is much employed in charging beer, applicable in catheterization. The carbon dioxide gas seems to exert a somewhat stronger irritation on the mucous membrane than air does. Otherwise the action is no different. Its use caused dizziness in only one case. The author has not used it in Politzeration on account of the severe irritation caused by it in the throat. The abstractor cannot find any particular value in the method which would overcome the discomfort of its use. *Levy.*

Hemorrhage Following Erosion of the Cranial Blood Vessels, in Suppurations of the Temporal Bone.

EULENSTEIN. (*Zeitsch. f. Ohrenheilk.*, Bd. 43.) If a suppurative process attacks the sinus, usually no hemorrhage follows, because a thrombus is formed in the lumen of the vein before it breaks through. Only in the rare cases where the infection progresses very rapidly and the thrombosing is slower, there is hemorrhage, usually during the operation, because then a sudden lowering of the pressure on the walls takes place. The blood then flows outward, through the wound, meatus, or tube, or inward between brain and cranial capsule. The author reports a case observed by him. It was a 5-year-old boy, five days after an attack of scarlatina had an ear ache, and seven days later had to be operated. The sinus was found permeable, covered with pus at one small place. Eleven days later a spontaneous, profuse hem-

orrhage took place which had to be checked by pressure bandages. As a high fever now set in, the bandage had to be changed, but this had to be given up on account of the tremendous hemorrhage. This was repeated several days later. Pyemic symptoms appeared. The jugular was then ligated, and the sinus laid bare in its horizontal portion. While compression was made here with the finger, it was possible to change the sinus tampon, with very little bleeding, and to cleanse the wound. The new trepanation opening was closed primarily. When the bandage was changed the next time, 19 days after the first operation, a terrible hemorrhage took place. Nevertheless the case ended in complete cure. The author recommends, in such cases, the methods used by him. Of the 18 cases reported in the literature of spontaneous hemorrhage from the sinus, only three had a favorable termination.

Lery.

A Special Method of Treatment of Suppuration of the Middle Ear, and the Principal Drugs Used.

EHRENFIND (*Deutsche Med. Wochen.*, 1902) recommends very highly a method used by him for years in the treatment of suppurations of the middle ear, especially in chronic otitis, and also in the severe, acute cases. It is as follows: After thoroughly cleaning the ear, the patient takes a horizontal position, with the suppurating ear upward. A weak solution of lysol is dropped into the ear, and left for ten minutes. In this way it makes its way into the neighboring cavities of the ear. The fluid, with the dissolved pus, is now sucked out with a rubber syringe. This is repeated 10-20 times. According to indications, the whole process should be repeated two to three times at one visit. In this way it is possible to remove pus and cholesteatomatous masses and even granulations from the adjoining cavities. This method must be carried out every day for months or even years. The results obtained by the author establish as indication, for operation only an immediate danger to life, such as a severe pyemia and meningitis, and secondly, stenoses of the external canal. Caries of the ossicles always heal, often with good functions. In place of lysol (1-30) can be used alcohol, formalin, and especially Muck's peroxide of hydrogen. The method was

severely attacked from many sides, when it was reported at the Berlin Otologic Society. Independent of the fact that few patients have the time or desire to spend for months and years several hours a day with the doctor, it seems a priori impossible that one could reach in this way the focus, which is sometimes entirely walled off. The indications which the author propounds can turn out very unpleasantly for those physicians who subscribe to them. Whoever waits for the first symptoms of pyemia or meningitis will usually be too late with his operation. *Lery.*

A Case of Sinus Thrombosis and Otogenous Pyemia Healed by Operation.

KOCH, (*Ugeskrift for Lager*, No. 49, 1902.) The patient was a girl of twelve years, who suffered with a chronic discharge from the middle ear of the right side, following an attack of scarlatina at the age of three years. Without any demonstrable cause, then suddenly supervened pain in the ear, nausea, vomiting and dizziness. Two days later the temperature rose to 40 C., with chills and for three weeks intermittent fever.

When the mastoid process was opened there was found a cavity filled with stinking pus. The dura was laid bare at one place in the posterior cranial fossa. As this was chiseled away and enlarged, a lot of foul-smelling pus flowed out of a perisinic abscess cavity of the size of a hazel nut. The wall of the transverse sinus was ulcerated through and the sinus was filled with degenerated, purulent thrombi masses. Three days later it was attempted, but vainly, to reach the foramen jugulare; one week later, a perivascular abscess on the neck was opened. Finally, an infarct of the left lung appeared, coupled with an abscess of the lung and empyema. Patient was discharged from the hospital at the end of three and a half months. The author closes with a discussion of the symptomatology of sinus thrombosis and the conditions necessary for the development of otogenic pyemia. The diagnosis of sinus thrombosis is often made only after an explorative operation, and even then is difficult to decide before an incision has been made into the wall of the sinus.

J. F. Fischer.

The Etiology and Prophylaxis of Necrosis of the Bone in the Course of a Chronic Otitis Media Suppurativa.

SCHEIBE. (*Zeitsch. f. Ohrench.*, Bd. 43.) In earlier investigations, the author came to the conclusion that the existence of necrosis in acute suppuration of the middle ear was almost entirely dependent on constitutional diseases, such as tuberculosis, lues, diabetes, influenza and scarlatina. He has recently examined the bodies of thirty-four cases of chronic ear suppuration for the presence of necrosis. In twenty-five cases the aural suppuration was the cause of death of which sixteen were complicated by necrosis. There was an additional case of necrosis. Of these seventeen cases, sixteen showed cholesteatomata; the cause of the necrosis was retention of pus, and in contrast to the acute cases, constitutional diseases had no part. In his private practice, he observed seven cases, in vivo, of necrosis complicating chronic suppuration. In all cases were cholesteatomata present, usually complicated by granulations. Here also, retention of fetid pus was the cause of the necrosis. *Levy.*

The Mastoiditis of Diabetics.

EULENSTEIN, (*Zeitsch. f. Ohrenheilk.*, Bd. 42.) The author has analyzed a number of his own observation, and those in the literature, 70 in all, on mastoiditis in diabetics, and concludes, contrary to the prevailing belief, that the course of the mastoiditis is not materially affected by diabetes, but depends chiefly on the richness of the mastoid in cells. *Levy.*

General Sepsis in Suppuration of the Middle Ear, With a Central Perforation of the Drum.

(*Zeitsch. f. Ohrenheilk.*, Bd. 42.) In the course of the last 10 years, Bezold has seen 10 cases which, in his opinion, have something typical about them, and therefore, ought to be classed together in a special group. In each of those there was the picture of an acute sepsis but without the clinical or anatomic findings giving a sufficient explanation.

In the first case, which was an acute exacerbation of an old suppuration, death occurred 14 days after the onset, accompanied by severe general symptoms. The autopsy showed

minimal changes in the middle ear and antrum a thrombus in the bulbus jugularis, attached to the wall, and embolic foci in the lungs.

In the second case, death occurred 10 days after the onset of an acute otitis media. In this case the mucous membrane of middle ear and antrum was greatly swollen and dark red. Between the dura and the posterior surface of the temporal bone was some pus. The external wall of the sinus showed the signs of a mild phlebitis without the thrombosis. The sepsis apparently had its origin here.

In the third case, there had existed from childhood an occasional discharge. Suddenly there was a severe headache, fever, chill, stupidity and difference in the pupils, which indicated an operation. Several inflamed lymph nodes were found; in the cells a small amount of pus and fibrin clot; in antrum nothing. Convalescence lasted unusually long. The malignant course is in sharp contrast to the usual course of otitis with central perforation. The author, therefore, believes that there was a simultaneous invasion of the mucous membrane and lymph nodes by streptococci, and that they had made the sinus easily penetrable. *Levy.*

A Typical Disease of the Ear.

R. MUELLER, (*Zeitsch. f. Ohrenheilk.*, Bd. 42) saw in about 12 patients, who lived in the tropics, a peculiar affection of the auditory canal. The disease begins insidiously as a feeling of fullness in the ear with ringing and diminution of hearing. Objectively there is a swelling of the auditory canal. Pain is entirely absent. In some patients, healing occurred after a few weeks, in others a severe pain lasting for weeks was experienced. After the disappearance of the disease there was usually left behind a severe hyperostosis together with tinnitus and difficulty in hearing. Ten months or several years pass before this stage is reached. The preliminary symptoms of this disease, which the author calls otitis externa ossificans, have been observed by other authors. The treatment had no effect in any case.

Levy.

A Case of Tuberculosis of the Middle Ear (Secondary).

ARTHUR H. CHEATLE. (*Jour. of Laryng., Rhin. and*

Otol., April, 1903.) H. R—, aged fifty. His wife had died a short time ago of consumption. The patient came to hospital May 29, 1902, on account of deafness, discomfort, and slight discharge from left ear for three weeks. There was swelling and dull redness of the posterior and inferior segment of the drum, with slight watery discharge. The perforation could not be precisely located. There was tuberculosis of left lung with tubercle bacilli in sputum. Later the redness and swelling diminished, showing a pinhead perforation with thick red edges in inferior segment. The discharge became more purulent and pulsated. Bacilli indistinguishable from tubercle were found in the discharge, and the patient was losing flesh.

Specimens of Tuberculosis of the Temporal Bone.

A. H. CHEATLE. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) 1. Right temporal bone of an infant who died of general tuberculosis. A perforation in the posterior segment of the membrane. The lining membrane as seen through was thick and nodular. The ossicles were intact. The middle ear, including the antrum, was full of cheesy pus. Sections of the lining membrane stripped off from the external semicircular canal showed tuberculosis. This specimen and section were shown at the Society's meeting, February 4, 1901.

2. Right temporal bone of an infant who died of general tuberculosis. The antrum was opened during life and caries of tegmen found. The bone around operation limit showed great extension of the disease, being white and porous. There was a large gap into the middle fossa; the exposed dura mater showed tuberculosis on section. The Fallopian canal was opened by the disease, and the nerve was destroyed. The promontory was rough and carious; both fenestra were irregularly enlarged, and the labyrinth was invaded. The external semicircular canal was opened by the disease.

3. Left temporal bone of a child who died of general tuberculosis. Complete loss of membrane. The handle, short process, and neck of malleus were destroyed, also the descending process of the incus. The promontory was carious above the round window. The stapes was in position. The tympanic plate was white and carious. The middle ear cavities were full of brown pus.

Temporal Bones Removed from Patients who Died of Tuberculous Meningitis.

A. H. CHEATLE also showed the following: 4. Right temporal bone of an infant who died of tuberculous meningitis. The membrane was intact and bulging. The middle ear cavities were full of pus. The petro-squamosal sinus was well developed, and had a patent opening into the lateral sinus. The tuberculous nature of the middle ear trouble was not established.

5. Right temporal bone of a child aged two years and seven months who died of tuberculous meningitis. Small perforation behind tip of handle of the malleus. The lining membrane was thick. Middle ear cavities were full of pus. The petro-squamosal sinus was well developed. The tuberculous nature of the middle ear trouble was not established.

6. Left temporal bone of an infant aged four months who died of tuberculous meningitis. Membrane intact. Middle ear cavities full of pus. Petro-squamosal sinus well developed. Tuberculous nature of pus in tympanum was not established.

7. Right temporal bone of an infant aged one month who died of tuberculous meningitis. Small perforation in Shrapnell's membrane. Middle ear cavities full of pus. Petro-squamosal sinus was well developed. Lining membrane of the middle ear was thickened. Sections of the lining membrane showed small-celled infiltration of the superficial layers, and destruction in patches of the epithelium. No tubercle.

Specimens and Microphotographs Illustrating Tuberculous Disease of the Ear and Naso-pharynx.

WILLIAM MILLIGAN. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) 1. Temporal bone with perforation of the tegmen tympani, the result of tuberculous disease of the middle ear; death from septic pia-arachnitis.

2. A microscopic section, showing bacilli in pus, obtained from a periotic glandular abscess.

3. Microscopic section of a tuberculous gland, secondary to tuberculous middle ear disease, showing caseous and fatty degeneration.

4. Microphotograph showing tuberculous disease of posterior surface of uvula.

5. Microphotograph of tuberculous granulation from middle ear.

A Case Illustrating Tuberculous Disease of the Nasal Cavities.

HERBERT TILLEY. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) Patient was operated upon five years ago for tuberculous ulceration of the internal surface of the right alae nasi and anterior end of right inferior turbinal. Well-marked contraction with some loss of substance of right alae nasi. Tuberculous nature of ulceration established by microscopic examination.

November, 1902, patient was readmitted to hospital for obstruction in the left nasal cavity. A swelling consisting of pale granulation tissue was seen occupying a part of the lower region of the cartilage of septum. This was thoroughly curetted and trichloroacetic acid was rubbed in. Tuberculous nature of granulation tissue was verified by microscope.

Primary Tuberculosis of the Ear. The Specimen from A Case of General Miliary Tuberculosis with Primary Focus in the Temporal Bone.

JOBSON HORNE. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) A child, aged thirteen months, had been wasting for seven months, and had had a cough of three months' duration. No aural symptoms had been mentioned, nor had there been evidence of pain in the ear, but there was facial paralysis on the right side, and it was elicited that there had had been a discharge from the right ear for about four months.

The post-mortem examination revealed a subperiosteal abscess lying over a well-defined area of necrosed bone, immediately above and behind the right external auditory meatus.

The tuberculous nature of the disease of the ear was definitely established by tubercle bacilli being found in the tissues covering the necrosed bone.

There was very extensive disease of the lymphatic glands, general miliary tuberculosis, tuberculous meningitis with tuberculous nodules in the brain, all of these lesions being more recent than that in the temporal bone.

A Case of Cholesteatoma Removed by Operation; Facial Paralysis Rapidly Subsiding.

DUNDAS GRANT. (*Jour. of Laryng., Rhin. and Otol.*,

April, 1903.) Harry E——, aged twenty four, shoemaker, suffering from chronic suppuration of the middle ear of eighteen years' duration, but worse during the last three years, was referred to Dr. Grant by Dr. Wingrave for radical mastoid operation, as, although the discharge had slightly diminished under the local antiseptic treatment, Dr. Wingrave found signs of caries on the posterior wall, and felt convinced that nothing short of the radical mastoid operation would suffice. The radical operation was performed on October 21, 1902, by Dr. Dundas Grant, assisted by Dr. Ambercrombie. Before the operation Dr. Grant noticed a very slight inequality of the action in the closing of the two eyes, but nothing amounting to paralysis. When the bone was opened in the mastoid region, a shiny, whitish-gray membrane was exposed, somewhat suggestive of dura mater; but when the opening was still further enlarged this was found to be the outer wall of a cholesteatomatous sac; this sac was then enucleated in its entirety, leaving a bony cavity with smooth walls of the size of an ordinary playing marble. During the scraping of the soft crumbling bone on the posterior wall of the meatus violent twitching of the facial nerve took place. The cavity was packed with gauze saturated with an emulsion of iodoform in glycerine; the posterior wound was not closed by sutures, but left open for grafting, and a drainage tube was inserted into the external auditory meatus. Next day there was paralysis of the left half of the face and some giddiness. Sickness persisted for four days. On November 4 the lining of the cavity by Thiersch's graft was performed by Dr. Grant. The graft was fixed in position with small pads of cotton-wool powdered with aristol. The plugs were not completely removed until the 13th; the interior of the ear was swabbed with spirit. A continuous galvanic current was applied regularly by Dr. Ramsden, the house surgeon, but scarcely any contraction was produced for a fortnight. The patient went home, and when he last presented himself for examination at hospital there was hardly any discharge from the outside wound, very little from the meatus, the facial paralysis had practically disappeared, no trace remaining except at the angle of the mouth, the noise and giddiness had gone, and the patient was greatly improved

in general health. The hearing before the operation was almost nil, and has remained much the same since. The facial paralysis rapidly subsided during the third week after the operation.

A Case of Suppurative Ethmoiditis and Frontal Sinusitis After Radical Operation for Nasal Polypi.

ADOLPH BRONNER. (*Jour. of Laryng. Rhin. and Otol.*, April, 1903.) In the Section of Laryngology at the Manchester meeting of the British Medical Association, Dr. Bronner had stated that, in his opinion, the so-called radical operation for nasal polypi was not devoid of danger, and that he knew of several cases which had been followed by meningitis and death. He was not at liberty to give details of these cases, as he had heard of them *privately*, and had no permission to publish them. He was very sorry to have now to report a case of his own.

Miss K——, aged twenty, was seen on July 24, 1900. Both nostrils had been blocked for several years, and there had been a copious purulent discharge. No pain or special discomfort. Both nostrils were completely filled with polypi and degenerated mucous membrane of the lower turbinated bones.

On September 18, 1900, both nostrils were scraped with Meyer's ring, and the mucous membrane of the lower turbinated bones removed. Insufflations of iodoformogene and boric acid were ordered. The patient was seen again in June, 1901. There had been extensive recurrence of the polypi from the upper turbinated bone. It was again scraped.

On August 14 the patient was seen again. Numerous polypi were removed by the cold snare. There was, however, rapid recurrence. On October 28, 1902, Meyer's ring was again used under chloroform. Insufflation of aristol and boric acid were ordered. The patient was seen on November 7 and 20. There was no pain, but very slight tenderness over the right frontal sinus. There had been no recurrence of the polypi, but there was very slight purulent discharge from the region of the frontal and anterior ethmoidal cells. On December 2 the patient was brought into the hospital. For nine days she had intense pain in the nose and head, and

there was swelling of the nose and forehead. She was semi-comatose; there was well-marked swelling of the center of the forehead and bridge of the nose, extending into the cheek, and slight paresis of the right side. Temperature 104°.

On December 3, an incision was made above the right eyebrow; much pus escaped, the bone was rough. The right frontal sinus was found to be full of pus. The dura was exposed and bulging; on incision there was pus. The left frontal incision was opened and a large quantity of pus escaped. The opening was enlarged and free drainage established. The patient was relieved for twelve hours, and then became more and more comatose and died.

On post-mortem examination the anterior part of the left frontal lobe was seen to be necrosed, and evidences of purulent meningitis were seen commencing on the left side, extending backward on the base of the brain (well marked over the pons) as far as the medulla. The lateral ventricles were full of pus. The whole of the ethmoid bone was necrosed and filled with pus, and the crista galli was quite loose and detached.

In this case the infection evidently originated in the ethmoid bone.

Contribution to the Study of Otogenous Meningitis.

SCHUBE (*Arch. f. Ohrenheilk.*, Vols. 57-58) has worked on the material of the clinic at Halle, with reference to the cases of meningitis. In 6 cases the spinal cord was involved, without any important clinical changes. The process usually passes from the labyrinth into the meninges. Testing the hearing gives uncertain results. Diminution of bone conduction speaks for, but presence of this does not speak against labyrinthal involvement. If this can be positively proven, the intracranial complication should be sought, in all probabilities, in the posterior cerebral fossa. The course of the fever may resemble pyemia. There can, however, be remittent or intermittent fever, and intervals without fever. The different irritative symptoms often are absent and may be present in other diseases. The best symptom of meningitis is disturbance of the sensorium. But the diagnosis is made from an entire symptom complex, not a single one.

The differentiation between labyrinthal and meningeal symptoms is especially difficult. In regard to the diagnostic value of the lumbar puncture, the Halle clinic has changed its point of view. Formerly an increase in the leucocytes in the cerebro-spinal fluid was taken as a sign of meningitis, but additional investigations have shown that only the presence of bacteria is pathognomonic. The fresh specimen must be studied for 40 minutes as often as there is a decreased affinity for the stain. The cultivation in these cases often fails. The origin of meningitis in concussion during chiseling, has been shown as improbable. Two cases of meningitis healed spontaneously. The author had made the diagnosis, but considered the cases inoperable. *Lery.*

II.—NOSE AND NASO-PHARYNX.

The Occurrence of Rhodan in the Nasal Secretion, and its Absence in Ozena.

MUCK, Rostock. (*Archives of Otology*, Vol. XXXII, No. 2.) Rhodan (potassium or sodium) forms a normal constituent of the nasal secretion, and is derived principally from the serous glands.

One sometimes is able to obtain a very distinct ferric chloride and iodine acid reaction, if we touch the pockets of the nose with our reagent paper. The accumulation of salt at this location and at the introites in general is because the nasal secretion in passing dries up in this region, and in drying the salts are here precipitated.

In chronic catarrh of the nasal mucosa the serous exudate becomes greater than the mucous; then the rhodan test is unusually striking. Inorganic salts have been shown to increase from $\frac{1}{2}$ to 1 per cent.

Pure nasal hydroporrhea can be differentiated from cerebro-spinal fluid by the fact that the latter does not contain rhodan.

When rhodan is unusually abundant in saliva, a very distinct rhodan reaction appears in the nasal secretion. The opposite holds true in the absence of rhodan in saliva.

In 20 cases of genuine ozena examined in one day, was a

weak reaction for rhodan found. The fluid contained in Gottstein's packing gave no reaction. Fatty degeneration of all glandular epithelium is the most constant condition present in ozena; consequently the serous secretion is diminished in quantity and in its constituent parts. *Campbell.*

An Automatic Method of Demonstrating the Accessory Cavities of the Nose.

BRUEHL, Berlin. (*Archives of Otology*, Vol. XXXII, No. 2.) A fresh or alcohol skull is macerated one quarter; the soft parts are dissected off and it is decalcified in a 10 per cent. nitric acid solution. Decalcification is complete in two to three weeks. After washing in running water, the skull is hardened in alcohol, then dehydrated and finally subjected to a mixture of equal parts of absolute alcohol and ether. The specimen is now placed in carbol-xylol. On the following day if the bone has been dehydrated and decalcified, it is cleaned.

An opening is now made in the septum of the frontal sinus, its nasal canal is closed off with cotton and Wood's metal, heated just enough to melt it, is poured into the sinus with the specimen held on its side. The sphenoidal and ethmoidal sinuses are then filled, and the maxillary antrum is filled from an opening in the canine fossa.

Enlarged blood vessels appear through the bone and the furrows in the bone for the vessels may be outlined with water color. *Campbell.*

A Case of Endothelioma Occurring Within the Nasal Fossae.

WM. HITSCHLER AND GEO. B. WOOD, (Philadelphia. *Philadelphia Medical Journal*, May 2, 1903.) The primary endothelioma of typical character is very rare; hence the interest of the case reported. Patient was 44 years of age, a farmer by occupation, with a history of epistaxis from the left nostril followed by gradual closure. There was little or no pain. During two years polypi had been removed. Five months previously patient noticed a forward and upward bulging of the left eyeball. Examination showed the left nasal fossa completely obstructed by a grayish, shining, lobulated mass, bleeding freely when touched by the probe.

A large part of the mass was snared off, followed by profuse bleeding, requiring packing.

Examination of the part removed showed the growth to be made up of connective tissue stroma, supporting numerous alveoli, which varied greatly in size and shape, and were formed by more or less regular rows of cuboidal cells, the nuclei of which are round and fairly deeply stained. In some parts of the growth a more malignant disposition was manifest in the arrangement of the alveoli.

The patient was urged to have a more radical operation but refused and disappeared from observation.

Richards.

Orbital Cellulitis; Empyema of Ethmoid and Frontal Sinuses; Brain Abscess; Pneumococcemia; Pneumonia; Death.

E. GRUENING. The patient (L.S.), 26 years old, butcher, was admitted to Mt. Sinai Hospital with history of agonizing frontal headache, pain in both eyes, eye lids swollen, especially on left. Nasal discharge. Chills, fever. No vomiting. At times becomes unconscious—at others delirious. These symptoms having begun with an acute onset six days previous to admission.

Physical Examination:

Throat congested.

Ears, negative.

Nose: Between left middle turbinated wall and external wall of the nose there is a thin streak of white pus.

Eyes: Left, marked chemosis of both lids, redness extending over bridge of nose, and down on cheek. Marked tenderness at inner angle of orbit, over ethmoidal sinuses. No tenderness over frontal sinuses. Marked conjunctival edema and congestion; motility of eye upward impaired. The left eye is more prominent than right eye, the globe being forced forward and downward. Pupil slightly larger than the right. Ophthalmoscopic examination negative.

Temperature 103.8°. Pulse 76. Respiration 26.

March 29. Operation. Incision and drainage for orbital cellulitis. Osteotomy and drainage for empyema of ethmoidal and frontal sinuses left side. Muco-pus from cavity of ethmoidal cells. Much pus from the orbit. Lachrymal gland removed.

Culture of orbital cellulitis:

Pneumococci and staphylococci.

Culture from ethmoidal sinuses:

Pneumococci.

Roof of orbit opened. Cavity of frontal sinuses entered; contained pus. Mucous membrane of cavity much thickened. Entire floor of the sinus, roof of orbit, several polypi and exostosis removed. Drainage and iodoform dressing.

Culture from frontal sinuses: *No growth*. Very slight improvement after operation. Two days later (March 3) temperature rose to 105.4° with a pulse of 90. Respiration 28, having had a chill lasting 20 minutes. White blood count: 33,000. Rigidity of neck; quite delirious at times. Lumbar puncture 55 c.c. obtained.

Report on same: Polynuclear leucocytes, fewer mononuclear leucocytes; no red blood cells; spreads negative; culture negative; albumin increased.

This A. M. another chill. Temperature 107° ; pulse 124; respiration 34. Change of dressing. Slight sero-purulent discharge. Renewed wet (10 per cent. carbolic). Patient gradually becoming stuporous; involuntary urination and defecation. Ophthalmoscopic examination: Considerable dilatation of veins of the disc, especially the left.

Operation. Exploration of left frontal lobe. The inner plate of the skull found softened (surface forming roof of frontal sinus). On exposure of dura there was a gush of foul smelling pus from an extra-dural abscess. Dura opened, freeing over an ounce of foul pus from a brain abscess the size of a walnut. Exploration of cavity with finger; *no definite abscess wall* could be made out. Dry dressing.

Temperature down to 103.4° after operation. Patient could be made to answer questions.

Culture of brain abscess; pneumococci: On following day patient became worse. Temperature had fallen to 99.6° ; but on morning of this day patient had a chill followed by a rise to 105.8° . Pulse 164; respiration 50. White blood count. 20,200.

In the evening a general convulsion. Involuntary urination; pulse very weak.

Dressing. Purulent discharge and necrotic brain tissue

from wound. Convulsions repeated—of longer duration. Blood culture (12 c.c.) positive in plates and flasks; pneumococci.

April 5. Coma; thirteen convulsions; white blood count 20,000; respiration 50-60. Signs of pneumonia, base of right lung; pulmonary edema. Death, 7:35 p. m., April 6.

Wound examined. No other brain abscess; spinal fluid, no growth in culture. *Author's Abstract.*

Operative Uncovering of the Bulbus Venae Jugularis Internal.

PIFFL (*Arch. f. Ohrenheilk.*, Vols. 57-58) laid bare the bulbus, following Grunert's method, in a case of sinus thrombosis at the Zaufal's clinic. He then studied the anatomic relationships on the cadaver, and convinced himself that the facialis is in danger, especially when the sinus lies forward. He therefore devised another method, and employed it in one case. The incision for the mastoid operation was prolonged downward several cm. and the periosteum was bluntly detached from the inferior and anterior surfaces of the os tympanicum to the fissura glaseri, and the auditory canal detached anteriorly and inferiorly. Then the inferior and anterior bony auditory wall was bitten off by bone forceps to the recessus hypotympanicus. Finally the processus styломastoideus was removed. By this time the bulbus was visible and was laid bare by removing the surrounding structures. One must be careful not to go as far forward as the carotid. *Levy.*

Otologically Important Anomalies of the Cranial Sinuses; the Accessory Sinuses, and Importance of Veinous Communication.

STREIT. (*Arch. f. Ohrenheilk.*, Bds. 57-58.) In spite of the great importance of vessel variations in the cavum cranii, especially for the aurist, the literature on the subject is very scant. The author has done a great service by examining, on several hundred skulls, the relationships of the sinuses and veins which are important in otology, and by collecting the literature. *Levy.*

Caseous Empyema of the Nasal Accessory Sinuses.

STIEDA (*Zeitsch. f. Ohrenheilk.*, Bd. 42) observed three

cases. It was necessary to operate on the nose on account of its being filled with fetid, smeary, caseous masses. In all the cases the disease was manifest from weeks to months before the treatment. Fistulae and abscesses developed in the upper eyelid and inner canthus, which communicated with the nasal cavity, and at times sequestra appeared. In one case the lateral wall of the antrum was destroyed. The author believes that the primary condition was a suppuration of the ethmoid cells and antrum, and by ulceration of the bony wall, the pus sac had pushed itself into the nasal cavity. The empyema then became cheesy degenerated, and secondarily infected. In all three cases the affected territory was entered through the bony nose. *Levy.*

The Effect on Certain Subjective Aural Manifestations by Treatment of the Genital Spot of the Nose.

HAUG. (*Monatschrift f. Ohrenheilk.*, Bd. 37.) It is well known that Fliess has long claimed that hypertrophic conditions in the nose, especially on the inferior turbinate and tuberculum septi, cause by reflex action dysmenorrhoeic symptoms, and that treatment of the former cures the latter. He now reports a number of cases in which aural pain and tinnitus, which could not be explained by the objective appearances, became worse at the time of the menses, were partially healed and partially benefitted by cauterization of the swollen portion of the nose, called by Fliess the "genital spot." He recommends the advisability of considering the possibility of such a relationship in similar cases. *Levy.*

Acute Inflammation of the Pharyngeal Tonsils.

BECKMANN, H., (*Berlin Klin. Wochens.*, 1902) regards acute tonsillitis as the most important of the affections of the upper air passages. The tonsils are swollen, red and covered with muco-pus. The secretion can dry and take the form of crusts. The affection runs the course of an acute, infectious cold. The chronic swelling of the turbinates is a secondary development. The accessory sinus may also become affected. "Over 95 per cent. of the cases of acute and chronic otitis suppurativa are caused by pharyngeal tonsillitis." The so-called rheumatic facial paralysis, chronic pharyngitis, and angina follicularis arise in the same way. Muscular

rheumatism, endocarditis, chorea, influenza, scarlatina, always have a port of entrance in the pharyngeal tonsils, and pleuritis, pneumonia, nephritis and osteomyelitis often have. The frequent existence of tuberculosis of the tonsils leads to the conclusion that basil meningitis, vertebral and retropharyngeal abscesses take their origin here. The author likewise believes that affections of the apices of the lungs are to be explained by infection carried by the lymph channels from the tonsils. The treatment must be undertaken with this in mind. In case of enlargement, they are to be completely extirpated, even during the presence of an acute otitis media suppurativa.

The abstractor regrets, on account of the learned and doubtless correct views of the author, that the author was compelled to stop because of lack of time. *Levy.*

Cases Illustrating the Beneficial Effect of Mucin in Atrophic Rhinitis.

STUART-LOW (*Jour. of Laryng., Rhin. and Otol.*, April, 1903) said that the history of the cases, selected from many others similarly successful, showed well the intractableness of atrophic rhinitis to the methods more usually adopted, and proved the beneficial effects of the mucin treatment.

The first case was that of a young man, a carpenter by trade, who had suffered from severe atrophic rhinitis for many years. He had been a patient at numerous hospitals, and had been under various systems of treatment, having been obliged to leave workshop after workshop owing to the complaints of his fellow-workmen at the bench of the fetor of his breath. He had gone in for the mucin treatment thoroughly, observing and practically carrying out every detail, as he found at once that he obtained much relief from doing so. He now expressed himself as quite well and comfortable, and examination of the nose revealed neither crusts nor fetor. Mucin-feeding had been carried out, from eight to twelve mucin tabloids a day having been taken, which gave relief to the accompanying distressful gastric conditions. He was now following his usual employment uninterruptedly, even in the dusty air incidental to the trade, and only syringing with the warm mucin solution daily at bedtime. Mr. Stuart-

Low wished to thank Dr. Peter Ambercrombie for kindly handing him over this aggravated case for treatment.

The second case was that of a parlor maid who had been obliged repeatedly to leave good situations on account of the sickening odor of her breath. She had been attending doctors and hospitals for years. Two years had now elapsed since she first had the mucin treatment, and she was eighteen months in her last place, having got rid of all local ailment and greatly gained in her general health. The treatment was carried out very thoroughly for some months, but now she confessed to syringing only some three times weekly. Her engagement to be married was in jeopardy at one time, owing to the horrible stench, but now she was married, and there was no rumor of separation or divorce.

The third case was that of a receiving girl in a laundry, working much in a foul and dusty atmosphere. She had been under treatment for years at various hospitals and dispensaries. The mucin treatment had been adopted for six months, being thoroughly carried out, and with most satisfactory effect. She now only syringed three or four times a week with the warm mucin solution, and at bed time.

Mr. Stuart-Low further remarked that the preparation of the solution and the method of using it were practical points of importance. The solution should be made by rubbing up one tabloid and one soloid of mucin (Messrs. Borroughs and Wellcome) in 2 fluid drachms of warm lime-water and 6 drachms of warm sterilized water, or 1 drachm of saccharated lime-water may be used instead of the plain lime-water. This solution may also be employed as a spray for the nose and throat. If desirable, this may be more diluted, and the tabloid may be substituted for the soloid in very sensitive patients. In beginning the treatment, the specialist should see the patient daily for a week if possible, and the inner lining of the nose ought to be well massaged by means of a suitable probe carrying cotton-wool saturated with the warm mucin solution. In this way all crusts are effectually removed. This process is sometimes accompanied by a good deal of hemorrhage from the surface from which the crusts are rubbed off, but after a few applications the bleeding soon stops and crusts cease to form and accumulate. Instructions are

given to syringe morning and evening, although very soon it is only necessary to syringe once daily, and preferably at night. Directions are given that the syringing be done forcibly from above with an ordinary glass nasal syringe. The head being overextended, is thrown as far back as possible, and the left hand is used to keep it back by pressure under the chin, while with the right hand the syringing is carried out. With the head in this overextended position swallowing is prevented, the nasal lining is well flushed, and the fluid passes directly into the esophagus, so that the danger of forcing any liquid into the middle ear is avoided. Simply spraying the nose and throat is sufficient in mild instances. Mr. Rogers, of 327 Oxford street, has now perfected a set of mucin sprays for the nose, throat and larynx. Dr. Holloway's aluminium probes, made by Messrs. Arnold, are very suitable for working with mucin, as they are very light, can be very easily bent to any angle, and are very cheap.

Mucin given internally is of much assistance in remedying these cases, and eight to twelve mucin tabloids may be taken daily—two before and two after the meals. This has the effect of relieving the flatulent dyspepsia, overcoming the constipation, improving the appetite, and greatly benefitting the general condition. He also insists on these atrophic rhinitis patients avoiding close, heated rooms or sitting too near fires—and it is singular how often they are fond of doing so—and that dusty air should be shunned as much as possible. Walking a few miles a day, especially in the cold morning air, is also recommended, and instructions are given to inhale deeply and frequently through the nose as they go along. In this way the nose and its accessory cavities are well aerated and a healthier tone more quickly induced in their mucous membranes. Dr. Low has found that common salt is almost invariably very largely partaken of by this class of patients, and has a deteriorating influence on the quality of the mucous secretion, so its use is always peremptorily prohibited.

Dr. P. H. AMBERCROMBIE testified to the great benefit derived from the mucin treatment in several of his hospital patients suffering from atrophic rhinitis. He also remarked on the great improvement he had seen in symptoms referable

to the digestive system following a course of mucin feeding.

Dr. JOHN STEWART MACKINTOSH said he had made some trial of mucin in general practice. He found it useful in atony of the bowels in aged people where a tendency to fecal accumulation existed. A regular action of the bowels was obtainable thereby without the aid of aperients previously required.

He had had very gratifying results in a case of gastric hyperesthesia where gastric ulcer had been present some years previously. Before taking mucin the patient could only take liquid nourishment, any solid food causing great pain, probably owing to the presence of a painful scar. After taking mucin solid food of all kinds could be taken without discomfort. In this case mucin was combined in tabloid with menthol, and the menthol, being a nervine analgesic, may have played some part in the cure. He had seen excellent effects in a case of rectal carcinoma; the appetite increased, and pain, which was previously severe, almost disappeared. Injection downward through the colotomy opening showed the great cleansing power of a solution of mucin. He also used it in a case of gastric ulcer with a dangerous attack of hematemesis. The hematemesis was not repeated, and the pain on taking solid food disappeared under the mucin treatment.

Dr. HEMINGTON PEGLER inquired as to the *modus operandi* of mucin as a therapeutic agent.

Dr. ANDREW WYLIE said he had treated several cases suffering from atrophic rhinitis with mucin, and found it most beneficial. In three severe cases of well-marked atrophic rhinitis which had been treated with alkaline lotions for months, and with no result, improvement took place in a few weeks from the thorough spraying of the nasal cavities with the mucin solution. The hard crusts softened and disappeared, and in six weeks the patients were comparatively quite well. He doubted if Mr. Stuart-Low could cure a well-marked case in a week, and he found the strength of Mr. Stuart-Low's solution too great. After the crusts were removed the patients could not, in his opinion, without pain, use a stronger solution than one soloid in 3 ounces of water (instead of one soloid to the ounce, as recommended by Mr. Stuart-Low). He inquired of Mr. Stuart-Low how long the

treatment should be continued, and his opinion as to the strength of the solution of mucin advisable.

Dr. JOBSON HORNE considered that one might be unduly impressed with the therapeutic value of mucin in atrophic rhinitis. He had obtained similarly good results with lanoline. After the removal of the crusts and the discharge by douching, the atrophied parts had been massaged with lanoline on cotton-wool wrapped tightly round suitable probes. The good results he attributed as much to the careful application and massaging as to the medicament itself.

Dr. VINRACE asked the President if he might take it for-granted that, with the head fully extended, fluid syringed into the nostrils could not be swallowed. He also asked whether any of the accessory cavities of the nose would be liable to be flooded by the fluid.

Dr. WINGRAVE hesitated in accepting the local effects of mucin in removal of crusts, but considered the gastro-intestinal results of some value. He thought that the duration of treatment was far too short to admit of any definite expression of opinion.

Mr. STUART-LOW, in replying, said the action of mucin was local and general. Locally it was hygroscopic, and had a retarding influence on bacterial growth; it had also considerable cleansing powers, and being combined with an alkali, the acid present in the lining of the nose in this disease was neutralized. He thought it had some influence also in retarding the dermal changes that happened in the mucous membrane. The massage certainly assisted in removing and preventing the re-formation of the crusts; but many cases had improved equally well that never had repeated massage, having failed to attend regularly, and had only the syringing done. The mucin internally, and the daily massaging with the warm mucin solution, however, certainly more quickly got the worst feature of the disease ameliorated.

The administration of mucin tabloids had a wonderful influence in remedying the gastric disturbance that almost invariably accompanied the local symptoms. This was partly owing to mucin supplying the deficient protective mucous coating of the stomach, but mucin might have also some capability of improving the quality of the mucous secretion,

which was always perverted and depreciated. There was no danger of injecting the fluid into the nasal accessory sinuses in the overextended position when syringing.

Deflected Septum Treated by Moure's Operation.

PEGLER. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) Three cases were shown to exemplify the result of Moure's operation for deflected septum, all of which had been operated upon sufficiently long to guarantee a permanent rectification. They were selected from a series of patients aged from ten to fifty years, and though it was not pretended that a perfectly flat surface was presented, still, the angle of deflection was all but effaced, and comfortable nasal respiration was insured through both fossae. The operations had been performed under gas and ether anesthesia in the sitting posture, Moure's incisions being adopted, but substituting the exhibitor's septotome (shown at the meeting) for the former's septum scissors, over which, he ventured to think, it offered certain advantages, owing to the altered shape and size of the blades. The septum had been maintained in its new position by India rubber splints, combined in various thicknesses and shapes to suit each case; for whilst the exhibitor thought Moure's incomparably the best of the metallic tubular splints, he had not found it so shapable a dilator as he had anticipated. The India rubber had effected the same purpose whilst giving less pain, or, at least, inconvenience, especially in keeping itself in position. Following the recognized practice, he had frequently reduced the inferior turbinals on one or both sides to gain the necessary space. The incisions had been made from the front toward the back part of the septum, apparently the reverse order to that of Moure (see *Journal of Laryngology, Rhinology and Otology*, April, 1901), and, as regards the superior incision, experience taught him that it should not be made too high up in the receding angles of the upper lateral cartilages. Occasionally, especially when the deflection had been very pronounced, subsequent trimming along the line of union had been found advisable on one side or the other.

CASE I.—A woman aged twenty-three, the subject of nasal polypi in both cavities; Moure's operation performed for de-

flection of the triangular cartilage to the right, in order to reach the polypi which were obscured by it. No sooner had the obstruction been removed than the pent-up polypi obtruded themselves and were reached by the snare.

A similar case in a patient aged fifty would have been shown, but she had written excusing herself, owing to absence abroad with her mistress. She sent an excellent report. Both nasal cavities were completely occluded by polypi, the condition on one side being intensified by deflection of the septum to the left. Rectification was effected, and the polypi descended immediately upon removal of the splints. Both this and the previous case were subsequently curetted for the removal of pedicles and softened bone.

CASE II.—A young man, aged twenty-five, upon whom Moure's operation was performed at the Metropolitan Ear, Nose and Throat Hospital for uncomplicated nasal obstruction, in the presence of Mr. Walton Browne of Belfast. There was deflection of the septum to the right. Some trouble was experienced with the healing of the superior or roof incision, but it was afterward cleared by paring with the probe-pointed septum knife, and the ultimate result was very good.

CASE III.—A young gentleman, referred on account of absence of nasal resonance. He also complained of nose-bleeding and constant and recurring colds in the head. There was a history of a severe kick at football three years ago. The triangular cartilage was seen to present a convex surface in the left fossa, and was greatly thickened. Mucous membrane spongy, deep red, and bleeding on the slightest touch. Examination of the right chamber showed that behind this the osseous septum was also deflected to the left. Moure's operation was carried out in the first instance, the basal incision being extended well back into the vomer. Subsequently, owing to the structural narrowness of the bony fossae, it became necessary to reduce the left inferior turbinal anteriorly to less than one-third of its extent. Even after this an adhesion formed between the remainder of the turbinal and the septum, and on the right side an adventitious crest required to be removed, because this fossa was now too much encroached upon by the alteration of the space. The case was slow and presented many difficulties, but the result

is now satisfactory and the patient's health is greatly improved.

Large Naso-pharyngeal Fibro-myxoma, with Prolongations Extending to Anterior Nares.

DONELAN. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient, a youth aged 18, had suffered from marked nasal obstruction and defective speech from his second year. When seen, he appeared to have a large mucous polypus in each nostril, and a growth about the size of a walnut projected slightly below the soft palate, in pulling or pushing which the polypi were moved. The large growth was sessile, springing from the vault of the pharynx immediately behind the vomer. It was seized with forceps and came away together with the anterior prolongations, leaving the patient's nasal passages perfectly free.

A Case of Naso-pharyngeal Malignant Disease.

BARCLAY BARON. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient, a woman aged fifty years, had complained of deafness, obstructed nostrils, and discharge of blood and pus, for about eight months. Three months ago a hard, irregular growth had been scraped out of the naso-pharynx, with relief of all the symptoms. They had all returned, and there was much pain in the jaw and temple, especially on the right side, which was swollen. The naso-pharynx was filled with the growth, which protruded into the nostrils, especially the right one. It was hard and ulcerated. The nature of the growth was uncertain, lympho-sarcomatous-looking in parts, but with islands of epithelial cells in others. Dr. Baron asked for suggestions as to treatment; he was not inclined to curette again, but preferred either to leave it alone or deal with it more radically.

CRESSWELL BABER said the disease seemed to affect not only the naso-pharynx, but also the nasal cavity on that side. Therefore, if any operation of a radical character were performed, it would either have to be through the palate or an external operation.

Dr. McBRIDE said this case seemed to him to be one of very great interest. There was, to start with, the growth in

the naso-pharynx, and also one in the right nostril. He had no doubt that the pathological report was absolutely correct. The one point which struck him forcibly was that in a malignant case one would have expected more marked ulceration and sloughing than had taken place in this case after the removal of the growth. Then, another point arising in connection with that just mentioned was that this was probably a lympho-sarcoma; it would be worth while to try large doses of arsenic. He had seen several cases of lympho-sarcoma disappear wonderfully quickly under the influence of arsenic. He called to mind one case with a very large tonsil, which was reduced almost to its normal size by this means. The patient died of malignant abdominal disease within a relatively few months afterward in the North. She went to a home, but he was unable to hear the details of the last illness, and there was no post-mortem. In connection with malignant disease, he might refer to a case of extreme interest which he had to deal with some time ago. The patient, a gentleman, came to him with a very large ulcer in front of the epiglottis, at the back of the tongue, while there was a large, fixed, glandular mass in the neck. It looked specific, and he gave him iodid of potassium and mercurial inunctions, but they had no effect at all. He then tried him with large doses of arsenic, but this also was of no use. He might say he wished to punch a piece out for microscopical examination, but the patient refused to allow him. He went on with the iodid and arsenic for a long time, but without much benefit. Later the patient met a friend in Glasgow, who acted somewhat unprofessionally, but nevertheless for the patient's good. The patient's friend saw his prescriptions, and ordered him, instead of arsenic, cacodylate of sodium—another arsenical preparation. In about five weeks' time he said to him, "Go and show yourself to Dr. McBride." He came, and was undoubtedly very much improved. The ulcer had quite healed, but the cervical tumor remained. Later on he died, but the speaker did not know from what cause, and was unable to give any histological history of this case.

Mr. SPENCER said that cases of lympho-sarcoma differed from other forms of malignant disease, inasmuch as a surgeon could operate on them partly and remove a part of the

growth with benefit to the patient. He should advise removal piecemeal, or that a large portion should be removed, and that this treatment should be followed by giving arsenic and iodid of potassium, which drugs should give considerable benefit for a long time. There were many cases of malignant sarcoma—not only the most malignant and generally considered hopeless cases, but also those moderate forms of the disease—where one could do a partial removal with benefit to the patient. As regards arsenic, undoubtedly there were certain preparations of this drug which were more valuable than others in their action. He remembered a case which he had seen with Dr. Hall, and in which he had taken away portions of a large mass of lympho-sarcoma from the neck, where they had considerable difficulty in finding the particular preparation of arsenic which was most suitable to the case; in this case it was, so far as he remembered, the hypochlorid. This might explain what had been said of the new one, the cacodylate of sodium.

Dr. TILLEY remarked that he had had the opportunity of putting his finger into the post-nasal space, and he found its posterior and upper parts were covered by a large, well-marked, ulcerated surface, which was somewhat hard to the touch. No bleeding followed the examination. He was rather inclined to doubt the probability of its being a lympho-sarcoma. The feel of the ulcerated surface was suggestive of epithelioma. He would suggest that, if operative treatment were attempted, a laryngotomy tube should be first inserted, a sponge placed above the larynx, the soft palate divided, and, if necessary, some of the hard palate also removed. Such measures would give a full view of the growth, and hemorrhage could be readily controlled.

Dr. BARON thought that the method mentioned by Dr. Tilley was the only one likely to do any good. For a case like this a curetting operation was of no value, since the disease was too deeply situated. He had left a section with the Morbid Growths Committee, in case they cared to make use of it.

Growth in the Post-nasal Space, Appearing Below the Soft Palate, in an Infant.

FITZGERALD POWELL. (*Jour. of Laryng., Rhin. and Otol.*,

May, 1903.) The mother stated the child cried as if it "had a stoppage," and during sleep made a whistling noise. She said that she had noticed it from the time of the child's birth, and that the noise was not any worse now than it was then. There had been no discharge or hemorrhage from nose. The child was flabby, and backward for its age.

On examination, a reddish-looking growth, a little larger than the uvula, was seen protruding below the margin of the soft palate. On seizing it with a pair of forceps, and running the finger up along the growth, it was felt to be elongated and pedicle-shaped, growing from the vault of the pharynx. Considerable traction was made on it with the forceps, but it appeared to be tough and resisting.

Septotome for Use in Moure's and Other Operations for Deflection.

PEGLER. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The instrument was an adaptation of existing patterns of the best design, and could be had in two sizes, differing only, however, in the length of the cutting parts, which measured 1.75 and 2.25 centimeters (about 5-8 and 7-8 of an inch) respectively. These blades were modified from those of Moure's scissors, but they were narrower, somewhat probe-ended, for the protection of the limina vestibuli; their cutting edges were all but parallel, and they were symmetrical. Moreover, their necks or shanks were much less curved or bowed, and at the junction of the latter with the blades there was no bending on the flat. The remainder of the instrument closely resembled the straight-cutting pliers of Asch, but there was an addition of two powerful springs. The result of the combination was a simple and handy septotome, which worked well in practice. The springs insured the disengagement of the blades after closure upon the septum, an action which expedited operation, whereas strength and precision were secured by symmetry and the absence of angles in the shanks. Of the two sizes, the smaller was probably the more generally applicable; the slight increase in the length of the blade in No. 2 could scarcely obviate the necessity for extending the primary maxillary incision in osteo-cartilaginous deflections. The septotome was made for the exhibitor by Messrs. Mayer and Meltzer.

Tumor of the Nasal Septum in a Woman Aged Thirty-three.

HUNTER TOD. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The tumor grew from the anterior part of the septum, on the left side, and almost protruded from the nostril. There had been several attacks of severe-bleeding. The growth was polypoid, with a sessile base. Only a small piece had been removed, in order to obtain a microscopic examination. There was considerable bleeding after this small operation, the nose requiring to be packed for some hours.

Frontal Sinus Disease, Showing Marked Expansion.

F. J. STEWARD. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) Alfred G——, aged thirty-six, was first seen on January 23, 1903, and gave the following history: Toward the end of 1901 he had developed nasal obstruction, and in December some polypi had been removed. In the following May a swelling had formed on the left side of the nose, close to the inner angle of the orbit; this had gradually increased in size, and burst a month later, discharging yellow pus. After about a month the sinus had healed spontaneously. The patient had been well until September, 1902, when the present swelling of the frontal region had commenced and steadily increased, without pain or any other symptom, except occasional discharge from the left nostril.

When seen on January 23 there was marked swelling in the frontal region, clearly due to expansion of both frontal sinuses, the most prominent part projecting fully one inch beyond the normal surface of the bone. Pus was also seen in the anterior part of each middle meatus. A few small polypi were removed from the left side, and an attempt was made to pass a cannula into the frontal sinus, without success. During the past fortnight free discharge had taken place from both nostrils, and the frontal swelling had markedly diminished, although it was still considerable.

The chief points of interest in the case appeared to be (1) the great expansion that had taken place without perforation; (2) the rapidity of the expansion; (3) the rapid diminution of the swelling during the last fortnight; and (4) the fact that the distension of the left frontal sinus did not lead to discharge through the old sinus.

Dr. DUNDAS GRANT said there seemed to be some softening of the bone, apparently periostitis, associated with the frontal sinus suppuration. He should be disposed to treat it actively with antisyphilitic remedies. Sometimes in this region one met with tuberculous disease of the frontal bone, but in this case he should first think of syphilis; so far as his experience went, when a frontal sinusitis was pointing to the surface of the bone it did not select that region. He thought there must be some specific condition present.

Mr. STEWARD, in reply, said that the patient had been treated with antisyphilitic remedies, but with no appreciable benefit.

Case of Disease of Both Frontal Sinuses.

FURNISS POTTER. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient had been under observation for two and a half years, the only trouble complained of being discharge from the nose. This had not been profuse, the patient not requiring to use more than two handkerchiefs a day, but was increased by cold weather. The drainage was ample, the fronto-nasal canals being especially patent, a curved probe being able to be passed into either sinus with great ease.

There was marked tendency to the recurrence of polypi in the neighborhood of the fronto-nasal canals, which had been repeatedly removed by snare and curetting. The patient was a soldier, and had been ordered to a station where it would be impossible for him to remain under observation. The case was shown as one in which the indication was not considered sufficient to justify the performance of a "radical" operation.

Columnar-Celled Carcinoma of the Naso-Pharynx.

DR. BRONNER. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient was first seen in April, 1898, when he complained of nasal obstruction and discharge from the nose. There was a good deal of hypertrophic rhinitis, and a small, soft tumor could be felt in the naso-pharynx growing from the roof and posterior wall. It bled freely on touch. A piece was removed and examined by the Clinical Research

Association, who reported that "the growth from the nasopharynx is a very soft columnar-celled carcinoma, covered with intact mucous membrane. The character of the growth suggests an origin in the antrum."

Insufflations and a formalin spray were used, and part of the growth was removed every three or four months, until May, 1902. It was then rather larger than when first seen, but did not project below the soft palate, and only slightly into the posterior nares. From that time the growth spread rapidly, and the patient died in October, 1902.

At the time of death there was well-marked exophthalmos and optic atrophy, with cerebral symptoms. There had never been much pain.

The case was of interest in many respects. Columnar-celled carcinoma in the naso-pharynx was very rare; the growth, although of the soft type, had only slightly increased in size in four and a half years. Was it possible that the application of formalin had arrested its growth? The absence of pain was also very unusual.

Sir FELIX SEMON, in reply to Dr. Bronner's question, said he did not put much belief in the efficacy of the formalin injection; it was the nature of these cases to be of long duration. It was, indeed, well known that malignant disease in the nose took a much longer course than malignant disease in many other parts of the body, and a duration of three or four years for a case of malignant disease of the nose was nothing very uncommon; he had seen several cases where it had existed as long as that. He was not prepared to say off-hand that columnar-celled carcinoma grew more rapidly than the squamous variety, but in this connection he would mention the following case: He had now under his care a girl aged twenty-one years, with a soft growth in the posterior part of the nose, and with enormous infiltration of the cervical lymphatic glands on both sides of the neck. The patient had been seen by various observers, and amongst others by Dr. Dundas Grant, who would perhaps remember that the case had been almost stationary for a period of more than six months. At the present time it was making very little, if any, progress.

Dr BRONNER asked Sir Felix Semon if he had not noticed

that the soft columnar-celled carcinoma grew much quicker than the squamous kind. The softer and more vascular a carcinoma was, the quicker was its growth in most cases.

Dislocation of Bones of the Nose, Due to Polypi.

KELSON. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient had suffered from nasal polypi for fifteen years and nasal deformity for six years. The left nasal bone was separated from the frontal, ethmoid and superior maxilla, and was perforated from pressure. The patient had no headache and only very slight discharge (muco-purulent).

Bleeding Polypus of the Nose in a Girl Aged Fifteen.

KELSON. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The growth originated below the anterior extremity of left-superior turbinate body, and was first noticed four months ago. It had twice been removed with temporary cessation of the hemorrhage. Microscopical examination showed a similar structure to the ordinary mucous polypus, but with more round-cell infiltration.

III.—MOUTH AND PHARYNX.

Two Cases of Adhesion Between the Soft Palate and the Posterior Pharyngeal Wall, the Result of Tertiary Syphilis, Operated on with Good Results.

P. H. AMBERCROMBIE. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) Case 1—Mrs. D——, aged thirty-six, contracted syphilis eighteen years ago, the primary sore appearing on the labium minus. Treatment was very insufficient, being only carried out for a period of a few weeks. About four years ago—i. e., fourteen years after the chancre—a gumma in the neighborhood of the knee developed, and in November, 1901, the pharynx was similarly attacked. Apparently, neither of these two illnesses was recognized as of a syphilitic nature, and the treatment was very ineffective.

In March, 1902, about five months after the first appearance of the pharyngeal gumma, the patient consulted the

late Mr. Lennox Browne, who at once recognized the true nature of the disease and prescribed suitable treatment. By this time, however, the naso-pharynx and oro-pharynx were completely shut off from one another by the adhesion of the soft palate to the posterior pharyngeal wall.

Toward the end of last March Mr. Browne operated, with the view of establishing a communication between the nose and mouth posteriorly, and so relieving the patient from the unpleasantness arising from her inability to blow her nose, which was constantly full of offensive discharge.

Mr. Browne made a large opening in the adherent soft palate, and then kept it open by the daily passage of bougies. For over seven months bougies were passed almost daily, but in spite of this the opening gradually closed, until it would only admit a No. 10 urethral bougie.

About this time Mr. Browne's fatal illness had progressed so far as to incapacitate him from trying any further operative measures, and he handed the case over to Dr. Ambercrombie, who on November 21 of last year operated on the patient, after thoroughly cocainizing the parts.

With a suitably curved, probe-pointed, double-edged knife, cutting laterally, the connection between the soft palate and the posterior pharyngeal wall was severed as thoroughly as possible. A rubber drainage tube was then passed along each nostril, and one end brought out by the mouth on each side, and attached to the other end of the tube by means of safety pins. These tubes had the effect of pulling forward the freed soft palate, and of preventing it reuniting to the posterior wall. The tubes were worn for ten days, being removed, cleansed and reinserted daily. The nose was syringed several times a day with chinosol solution.

The parts healed well, and at the end of a fortnight there was a large opening, and the patient could freely blow her nose and breathe through the nostrils.

Since then the opening had gradually diminished in size, and Dr. Ambercrombie was desirous of having the opinion of those present whether further operative treatment was advisable.

CASE II.—A man aged forty-eight, a laborer, was sent to Dr. Ambercrombie by Dr. Mackintosh of Mortlake, suffering

from an obstructed nose, the result of tertiary syphilitic adhesion of the soft palate to the posterior pharyngeal wall. The appearance of the throat in this case was very similar to the other. There was a small opening, sufficient to admit a probe, a little to the right of the middle line, and this communicated with the right nasal fossa posteriorly. The primary sore developed on the penis thirteen years previously, and the treatment was very insufficient. The throat began to be affected just over two years ago, and for about six or eight months the nostrils had been blocked.

The treatment in this case was the same as in the other, but the immediate result of the operation was not so good.

Both patients were present for examination, and in both the openings were gradually getting smaller.

Cystic Cholesteatoma from the Left Supratonsillar Fossa.

WYATT WINGRAVE. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) The specimen was removed from a patient under the care of Dr. Jakins—a young woman, aged eighteen, who had no symptoms, but accidentally discovered “something wrong” with her throat on looking into a mirror. It presented the appearance of a sausage-shaped tumor, about an inch and a half long and one third of an inch thick, hanging from the left supratonsillar fossa, curving over the tonsil, and reaching the glosso-epiglottic fossa. It was of a pearly-pink color, slightly constricted at three points, giving it a moniliform appearance.

It was attached by means of a thin pedicle to the *interior* of the fossa (the plica being quite free), and was easily removed by forceps and scissors, when the fossa was seen to be well marked, and admitted a probe into its canal to the depth of 10 millimetres in an outward and upward direction. The tumor was elastic and somewhat translucent in parts. On incision the capsule was found to be tough, and varied in thickness from 0.5 to 1.0 millimetre. A small amount of thin, opalescent fluid escaped exposing a core of pearly-white laminae, which consisted of scaly epithelium in all stages of degeneration, with fatty granules, thus affording the characters of a cholesteatoma or dermoid cyst. There were no leucocytes in the fluid, or any evidence of an inflammatory process.

The capsule (fibrous) was covered externally, and also lined with living stratified epithelium (squamous). Its walls contained embryonic tissue.

The cyst was evidently of developmental origin, and not tonsillar. Since the supratonsillar with Rosenmüller's fossa represent the second cleft, such neighborhoods are especially the seat of embryonic vestiges. An exhaustive description of this fossa is to be found in the *Journal of Laryngology, Rhinology and Otology*, vol. xiii, p. 165.

A pedunculated cyst of the tonsil was shown at the Belgian Society of Otology and Laryngology; from the report it is difficult to judge where it grew from (*Ibid.*, vol. xiii, p. 545), or whether the authors considered as illustrative of cystic degeneration of the tonsil a disease which is often seen, and is essentially a cholesteatomatous process.

Ulceration of the Left Tonsil, with Acute and Considerable Enlargement of Numerous Cervical Lymphatic Glands on Both Sides of the Neck. Malignancy (?)

FELIX SEMON. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) The case which had been shown two months before was shown again as affording a valuable lesson to the effect that not every ulceration of a tonsil in old people, accompanied by enlargement of numerous cervical glands, must be looked upon as necessarily malignant. It would be seen that the ulceration of the left tonsil had quite disappeared, and the tonsil itself had become much smaller, whilst the enlargement of the cervical lymphatic glands on both sides of the neck had also considerably diminished, even more so on the side corresponding to the affected tonsil than on the opposite one. In all probability septic influences had been at work. Malignancy, at any rate, was now completely excluded.

Ulcer of Tonsil Containing Tubercles, which had Yielded to Anti-Syphilitic Remedies.

LAMBERT LACK. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) The patient, a female aged twenty-five, had had a large ulcer, with clean-cut edges and sloughy, irregular base, covering the right tonsil and posterior pillar of the fauces. There was much dysphagia, and the patient was anemic and

rapidly wasting. The glands were tender and enlarged. A diagnosis of tertiary syphilis was made, and the patient placed on large doses of potassium iodid. She had, however, seen other specialists who had considered the case to be possibly malignant or tubercular. By special request, therefore, a small piece of the ulcer was excised for microscopical examination. The sections showed that the mass of the ulcer consisted of granulation tissue with newly-formed capillary loops, but at the deeper part of the ulcer were tubercle-like nodules consisting of giant cells, surrounded by epithelioid and round cells. This seemed to confirm the cautious diagnosis which had been previously given in the case. In spite of it, however, the ulcer, which at first was as large as a two-shilling piece, had diminished to half its size in a week, and was completely healed in a fortnight, under the iodid treatment alone. The patient three months later remained perfectly well. Was the case to be regarded as one of syphilis or mixed infection? There was no history of syphilis to be obtained.

Infiltration of Pharynx and Post-nasal Space.

FITZ GERALD POWELL. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient had complained of inability to sleep with his mouth closed. He stated about six months ago he found that he woke himself up with a loud snoring; this had gradually become more marked, occurring more frequently. He said that since the present trouble began he could fall asleep at any time. He had no pain, and was gaining flesh. There was no interference with deglutition or phonation, and there was no history of syphilis obtainable.

On examination, the whole of the pharynx, more especially the left lateral wall and post-nasal space were found to be the seat of considerable infiltration and thickening, giving the appearance of bulging. There was slight swelling of the edge of the epiglottis on the left side.

The tongue was marked with deep fissures and cracks. The uvula was attached along both its free borders to the posterior pillars of the fauces. The arms and wrists and inside of the foot showed patches of eruption, apparently dry eczema. He had been treated with iodid of potassium and mercury.

Hereditary Specific Perforation of the Anterior Pillar of the Fauces.

DUNDAS GRANT. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient, a boy aged fifteen, was seen for the first time on January 8, 1903, on account of pain and difficulty in swallowing. He was found to have an elliptical opening in the left anterior pillar, with thick, congested edges covered with a grayish-white slough. Behind it on the tonsil, was also a fairly circumscribed excavation with a sloughy floor. The symptoms were of fourteen days' duration, and there was well-marked evidence of a hereditary specific dyscrasia. The exhibitor brought the case before the Society because the opening was very similar to the congenital slit observed in several instances by members of the Society. He thought it would be interesting to observe at a later stage to what degree the opening would resemble the congenital malformation.

Operative Procedure for Relief of Almost Complete Adhesion of the Soft Palate to the Posterior Pharyngeal Wall, the Result of Tertiary Syphilis.

HERBERT TILLEY. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) Patient was a female aged twenty-three, in whom the soft palate was so completely adherent to the posterior pharyngeal wall that only a small probe could be passed from the oro- into the naso-pharynx. It had already been twice operated upon before coming under the exhibitor's care. In each case the adhesions had been divided, but no means had been adopted to prevent readhesion. In the course of ten days to a fortnight the original condition had returned. The symptoms complained of were a collection of mucus in the nasal cavities which tended to constantly flow from the anterior nares, inability to breathe through the nose, snoring, and other local discomforts.

Operation.—In view of the possibility of free hemorrhage occurring when the adhesions were divided, a preliminary laryngotomy was performed. The soft palate was then completely separated from the pharyngeal wall, and a strong silver wire was passed from before backward through the soft palate close to its junction with the hard palate, and about

half an inch from the middle line. The distal end of the wire was then made to repierce the soft palate close to its fore margin and from behind forward. By this means a short segment of the wire rested on the posterior surface of the soft palate. The free ends of the wire were then passed from behind forward, one upon each side of the root of the incisor tooth, firm traction exerted on the palate, and the wires twisted upon one another and cut off short in front of the tooth. A similar procedure was then adopted on the other side of the palate.

One wire cut out in about ten days, the second in a fortnight; but by this time considerable healing had taken place over the raw surfaces from which the adhesions had been separated.

Every day for three weeks the house-surgeon had passed his finger into the naso-pharynx and exercised firm traction forward upon the soft palatal structures. The operation was performed six weeks ago.

IV.—LARYNX.

The Operative Treatment of Laryngeal Tuberculosis.

LORENZO B. LOCKARD, Denver, Colo. (*Philadelphia Med. Journal*, April 18, 1903.) In view of the fact that most of the present methods of treatment of laryngeal tuberculosis produce temporary relief only, and that cures are very rare, the author advocates the adoption of the same surgical measures that are in use in other parts of the body for the cure of localized tuberculosis, specially if the lung involvement is comparatively slight. Dependent upon the location, nature and general condition, some one of the following procedures may be indicated: (1) Division of the pharyngolaryngeal wall; (2) division or complete removal of the epiglottis; (3) tracheotomy, and (4) laryngofissure.

The first operation is done in cases of diffuse infiltration and ulceration of the posterior wall and aryepiglottic folds when uncontrollable dysphagia is present.

With a pair of angular scissors, one blade in the pharynx and the other in the larynx, an incision is made connecting the two passage ways, down to and including the interarytenoid sulcus, and in the median line. This operation can be done under twenty per cent cocaine. Rectal feeding is required for a week. Relief is usually marked, and there is a subsidence of all inflammatory signs, which may last for months or years.

The second operation is indicated when the epiglottis is involved, and the organ may be divided from edge to base, or a complete amputation made.

Tracheotomy is indicated for threatened asphyxia, due to edema, perichondritis, abscess or subglottic swelling.

The complete rest afforded the parts accounts for the improvement which follows these operations. The ordinary conservative methods are to be tried first, but these failing, as they usually do, the author recommends a trial of more radical surgical methods.

Richards.

A Case of Laryngeal and Pulmonary Tuberculosis in a Man Aged Forty-seven.

WYATT WINGRAVE. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) The patient, when seen on January 20, complained of loss of voice of four months' duration, which came on suddenly. He afforded no history of phthisis or syphilis. He had lost flesh lately. On examination both ventricular bands and cords were inflated and ulcerated: there was much peri- and inter-arytenoid edema, with limited movements of both cartilages. There were well-marked signs in apices, and his sputum contained tubercle bacilli. The laryngeal edema had now considerably diminished, thus more fully revealing the extensive changes in both ventricular bands and cords. He was being treated with intratracheal injections of guaiacal.

Endothelioma of the Larynx.

JOBSON HORNE. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) A microscopic section from the case of a laryngeal growth under his care at the Metropolitan Ear, Nose and Throat Hospital, and which was exhibited by him at the last meeting. A portion of the growth he had removed for

purposes of diagnosis. Under the microscope the growth presented the structure of an endothelioma.

Functional Aphonia in a Man, with Unusual Symptoms.

LAMBERT LACK. (*Jour. of Laryng., Rhin. and Otol.*, April, 1903.) The patient, a male aged fifty-eight, had lost his voice suddenly six months ago, and had never regained it. He spoke now in a whisper, but with much strain. The expiratory muscles were all tense, and the pulse became more rapid during speech. On examining the larynx, the parts appeared to be normal, and the movements were normal until attempted phonation, when the larynx appeared to be tightly closed and to prevent all air escaping.

It was probably a case of spasm of the larynx, but the patient was not able to say even one word in a loud voice, thereby differing from most similar cases, in which one or more words could be loudly uttered at the beginning of each sentence. On the other hand, the patient could sing loudly and naturally. Another point of interest was that he had a similar attack the previous year, losing and regaining his voice quite suddenly. He had not used his voice excessively, although he had shouted at times. He had recently lost a sister with tubercular laryngitis. It was possible that suggestion had something to do with his present condition.

Dr. McBRIDE thought this case one of great interest. It was a case of spastic aphonia. The abdominal muscles were tense when the patient attempted to speak. The interesting point about the case was that the false cords covered the true cords when phonation was attempted. He had observed in certain voice users, who complained of early fatigue of the voice, a similar condition, but to a less marked extent. He wondered if other members had observed it also. The parts during rest were normal, but on attempted phonation there was apparently hypertrophy of one or other, or of both false cords. Whether this was to be looked upon as a "missing" or early stage of spastic aphonia or dysphonia was a point which had interested him for some years.

Cyst of Ventricle of Larynx Opened when Operating on a Case of Malignant Disease.

LAMBERT LACK. (*Jour. of Laryng., Rhin. and Otol.*, April,

1903.) The patient, a male, had malignant disease of the right vocal cord, etc., for which an operation was performed. Previous to operation, a smooth, fixed, hard swelling was noticed overlying and apparently attached to the cornu of the hyoid bone. There were no enlarged glands. On cutting across the ventricular band during the thyrotomy there was a sudden gush of creamy fluid, nearly 2 drachms escaping. The swelling over the hyoid bone disappeared. At first it seemed as if an abscess had been opened, but after consideration and exploration it was considered more likely that the cavity was a cyst-like projection from the ventricle, such as was normally present in certain apes—e. g., the orang-outang—and was rarely met with in man. This diagnosis was confirmed by sections of part of the wall which was excised, and which showed that the cavity was lined by ciliated epithelium.

Epithelioma of the Larynx.

ATTWOOD THORNE. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) This man was first seen at the London Throat Hospital on December 16. He had then suffered from hoarseness for six months, and slight pain on swallowing for a few days.

A view of the larynx (which was only obtained with difficulty) showed that the left cord was fixed in the mid-line, and that there was a growth involving the left arytenoid and extending into the aryepiglottic fold on that side. The larynx was slightly tender when examined from without, and there was a large gland just under the ramus of the jaw on the left side. There was a good deal of pain referred to the left ear, and restlessness at night. The man was of good physique, a carpenter, still pursuing his trade. He had two healthy grown-up children, and denied having had syphilis.

He was put on 15 grains of potassium iodid and a drachm of perchlorid of mercury, and for the last fortnight had been an in-patient. With the exception that there had been temporary swelling for a few days of the right arytenoid, there had been little to note, except that the enlarged gland had somewhat increased in size.

Case of Chronic Laryngitis with Interarytenoid Pseudo-Pachydermic Swelling, Probably Due to Purulent Rhinitis.

DUNDAS GRANT. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient, a girl aged twenty, was first seen the week previous on account of hoarseness, which was worst in the morning, and which had lasted two months; similar hoarseness was present during the whole of the previous winter, but had disappeared as that season passed off. There were crusts on the vocal cords and on the summit a sessile swelling, which interfered with the apposition of the cords. This swelling was irregular, and presented a white, sodden appearance. The patient was the subject of muco-purulent rhinitis, and the secretion tended to dry in the nose. There was deviation of the septum into the right nostril, and the right middle turbinated body was hypertrophied. The exhibitor considered the laryngitic condition to be the result of the inhalation of morbid secretion from the nose, and that the swelling in the interarytenoid space, which simulated pachydermia, was the result of proliferation and maceration of the superficial epithelium. He had prescribed a simple nasal wash, and the patient, presented at the Society, stated that the hoarseness had very much diminished during the week that the nasal wash had been employed. The swelling in the interarytenoid space had become somewhat smaller.

Paralysis of the Left Vocal Cord, Due to Lead Poisoning.

CHARTERS SYMONDS. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient, a girl aged eighteen, exhibited the usual paralysis of the limbs seen in this malady, and besides had paralysis of many muscles of the trunk. A blue line on the gums was marked. The left cord lay in the cadaveric position, and did not move on phonation. The rarity of the laryngeal affection was commented upon.

Ankylosis of Left Crico-arytenoid Articulation in a Woman Aged Twenty-three.

DONELAN. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) This case was shown on account of one of its less obvious features. The patient, a French lady, aged twenty-three, when twelve years old had been seen by Dr. Landouzy, of

Paris, who considered she was suffering from incipient tuberculosis. She, however, had apparently recovered, and had remained in good health until six years ago, when she had what appeared to have been influenza with acute laryngitis. Previously she had had an excellent speaking and singing voice, but at this time had completely lost it for about three weeks, after which it had gradually grown stronger. During the attack she had been treated by her family doctor, but hemoptysis having occurred a consultation had taken place, when the opinion had been given that the case was one of pulmonary tuberculosis and chronic laryngitis. The hemoptysis had continued at intervals for over a year, when it had ceased, and except for her defective voice she had been quite well since.

The most obvious symptoms were those of left abductor paralysis. She produced her present voice by compensatory approximation of the right vocal cord. There were no thoracic signs, pulmonary, vascular or glandular, and there were no evidences of former pulmonary lesions or impairment. The paralysis was complicated by ankylosis of the crico-arytenoid articulation, as evidenced by the absence of displacement of the affected cartilage on phonation, and by immobility on the application of a probe under cocain.

The case was regarded as one of left adductor paralysis occurring in the course of an acute laryngeal influenza, with subsequent bleeding from the laryngeal or tracheal mucous membrane, and in which ankylosis of the inflamed joint had supervened.

The patient had had no treatment of the larynx, except during the acute stage, and as, in her present employment, a better voice was very desirable, the opinion of the members was asked as to whether at this distance of time it would be advisable to attempt to set free the articulation, and try faradization.

Chronic Edema of Larynx.

DUNDAS GRANT. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) Mrs. I——, aged 45, was first seen January 8, 1903, on account of difficulty in swallowing without pain. This had commenced about twelve months ago. It had been

associated with slight hoarseness, most marked in the morning, and the voice had now the tone suggestive of a swelling in the pharynx. The larynx was the seat of a pale, somewhat solid edema of the epiglottis, and both aryepiglottic folds, especially the left; the cords appeared to be normal and mobile, though the left one, which was only partially visible, was somewhat restricted in its excursions. There was no ulcerations anywhere, but the palate and pillars of the fauces, especially the left one, were somewhat thickened. The patient had been losing flesh for the last three years, and had become pale, whereas she formerly had a good color. The urine was scanty and free from albumen; there was no history of prolonged suppuration; no suppurating gingivitis, no evidence of tuberculous or specific infection; no enlargement of glands. The swelling seemed rather solid for simple edema, too inactive for tuberculosis, and the suggestion occurred that it might be a form of amyloid change; the spleen was perceptible, and probably enlarged. The liver dulness was considerable, but, pending examination by a skilled physician, the exhibitor would not dwell upon this. He would be glad of suggestions in the meantime as to diagnosis and treatment.

FELIX SEMON was greatly interested in this case. It was so recently that he had brought a similar case before the Society (November, 1902), when he had also read notes of three other cases, that many of those present would remember that the subject of his first case, whom he saw many years ago, was the wife of a medical practitioner, who had come to him with a general infiltration of the uvula, epiglottis, soft palate and larynx. At first sight no one would have doubted but that it was a case of tuberculous disease. The only thing which had struck him as being unusual had been the infiltration of the pharynx and arches of the palate, just mentioned. He had examined the chest very carefully, but had found no evidence of tuberculous disease. He had tried various remedies, local and general, for nearly two years without effecting any improvement, and the patient had finally left him. Two years later the patient had come back, and the infiltration had disappeared, although she had been under no treatment in the meanwhile. Dr. Dundas Grant

had spoken of the case as one of amyloid disease. He, the speaker, wished to emphasize that he had merely spoken, when bringing his last case before the Society, of a lardaceous appearance, as he had no proof that the affection was actually connected with amyloid disease; the look of the parts merely reminded one most of the appearance of a kidney which had undergone lardaceous degeneration—this, they would agree with him, after having seen Dr. Grant's case, was a perfectly justifiable comparison. He hoped sincerely that the sequence of events in this case would be the same as in his own, but the spontaneous disappearance of the infiltration did not help them in the least as to its pathology. Since he had shown his last case he had read the original description of Quinke's disease, and felt sure the cases in question did not belong to that category. Following the suggestion of Dr. FitzGerald Powell, he had removed, with his patient's consent, the uvula, and had submitted it for microscopical examination to Mr. Shattock, who found no evidence of amyloid disease; the only thing he had so far found at a preliminary examination was an enormous infiltration of round cells. He was now waiting for a further report. He wished once more to express his pleasure that the Society had had an opportunity of seeing a particularly interesting instance of a hitherto undescribed, and certainly, pathologically, very obscure case.

DEHAVILAND HALL said that the laryngeal aspect of this patient reminded him of the case of a man shown to the Society six or seven years ago, the diagnosis of which had been very doubtful at the time; some members suggested lupus and others a chronic tuberculous condition. The disease had made gradual progress, and some eighteen months after showing the patient Mr. de Santi had performed tracheotomy. He had lived three years after this operation, enjoying a fairly healthy life, but eventually had died of pulmonary tuberculosis. The condition had therefore probably been a tuberculous infiltration; there had never been any ulceration, simply a pale, puffy swelling of the epiglottis and aryepiglottic folds, and the mucous membrane covering the arytenoid cartilages. The aspect had been, in fact, much the same as in this patient, but in the case he was relating

the pharynx and soft palate had not been involved.

BROWN KELLY had had a somewhat similar case, which he had described two years ago in the *Lancet* under the name of "sclerotic hyperplasia of the pharynx." He thought the President had had an opportunity of examining the case. The most marked change had been in the pharynx. The uvula had been immensely enlarged, being not only elongated, but also generally increased in size, and the lateral parts of the posterior pharyngeal wall had presented great and uniform thickening. The roof of the naso-pharynx had undergone similar changes. Treatment had had no effect on the condition. There was no history of syphilis, and anti-syphilitic remedies had given no relief. The last occasion on which he had seen the patient he had noticed that there was a tendency for the whole condition to grow less. He had cut off a large piece of the uvula and had examined it, but was unable off-hand to give details of the microscopical structure. These, however, together with illustrations of the pharyngeal appearances, might be found in the article referred to.

DR. GRANT, in reply, referred to several cases of amyloid changes in the larynx described in an article in a recent number of *Münchener Medicinische Wochenschrift*. He was bound to say that the examination of the rest of the body, which he had described to the society, rather contradicted the idea of amyloid disease, being negative as far as that was concerned. He thought these cases extremely puzzling, but no doubt, as their experience of them accumulated, they might be less in the dark than they were at present. He felt very uncertain about the real nature of this one. Quincke's disease was a more sudden thing, which passed off quickly.

V.—MISCELLANEOUS.

Adrenalin.

LEHMAN, (*Muench. Med. Wochen.*, 1902), has tested the action of adrenalin by injecting gradually increasing dose of

1 per cent. solution in the larger or smaller portions of the liver, and made them so anemic that they could be excised with a knife. There was not a drop of blood, and even later no hemorrhage, in spite of the severe secondary hyperemia. The action did not take place when he first excised the pieces of liver and then applied the solution to the bleeding surface.

Levy.

The Usual Methods of Treatment and Operation in the Ear and Throat Clinic at Rostock.

KOERNER, Rostock (*Archives of Otology*, Vol. XXXII, No. 2.) Examination of patients is made in broad daylight by the aid of strong electric lights. There is but one dark room, that used for transillumination of the accessory nasal cavities.

Digital examination of the naso-pharynx is made with a protected finger. Adenoid operations are performed in the well equipped operating-room.

As minor operations must be performed in the dispensary rooms, the painted walls are washed daily, all instruments are boiled, dressings are sterilized and soiled dressings immediately placed in porcelain receptacles.

In mastoid operations in men all the hair of the head is cut short and a wide area on the diseased side shaved.

Changes of dressings are made in a special room. After the removal of the dressing, the surrounding parts are cleansed with benzine and the head of the patient is wrapped in a sterile towel, which has a central opening, through which the wound and ear appear.

Irrigation fluid is simple sterile hot and cold water without the addition of any antiseptic.

Gauze strips have a selvedge and are in rolls. Cotton-mounted tooth-picks are collected in test tubes and there sterilized.

In pyocyanus infection of the middle ear, which is characterized by the greenish discoloration of the gauze the author has found packing and dressings impregnated with two to five per cent. silver nitrate solution the most efficacious treatment.

To guard against the exhalations of tubercular patients he

fixes a square handkerchief over the mouth and nose and this is held at the upper corners by tapes which, weighted by bullets are suspended over the ears. *Campbell.*

Tabes, with Early and Unusual Implication of Various Cerebral Nerves.

FELIX SEMON. (*Jour. of Laryng., Rhin. and Otol.*, May, 1903.) The patient was a stud-groom, aged forty-six, married.

Complaint.—Tightness round waist, difficulty in speech and in swallowing.

Duration of above symptoms, six months; has had lightening pains for two years.

Family History.—Good; married for eighteen years; six healthy children; none dead, no miscarriages.

Previous Health.—Good till twenty-four years ago, when he had some *kind of venereal disease*; denies any secondary symptoms. Never had any throat affection.

Present Illness.—*Two years ago* "lightning pains" in lower extremities. *Six months ago* "tight feeling" round abdomen at level of umbilicus. *Five months ago* he began to have trouble with his throat, which consisted of a difficulty in swallowing solids; no trouble with fluids. *Four weeks ago* feeling of numbness in inside of left cheek which, later, changed into right; now quite free. *Three weeks ago* voice began to get weaker. *Two weeks ago* his wife noticed that he made a peculiar noise when he was asleep. He replied that he was going to turn a "roarer." *One week ago* right eyelid began to droop, and patient had diplopia for one day. *Three days ago* some difficulty in starting micturition.

Never any loss of sight or hearing; no gastric or laryngeal crisis; no difficulty in walking at daytime or night; never any pains in tongue or throat.

Present Condition.—A rubicund man with tortuous temporal arteries; general health good; also mental.

Special Senses.—*Smell* and *hearing* good. *Taste* slightly affected on left side of tongue. *Sight*: Right, 6-8; left, 6-8. *Fields* not contracted. *Optic discs*: Left, normal; right, edge of disc soft, not blurred. Condition due to a retinal edema,

which causes a slight haze. Arteries suggestive of granular kidney, being irregular and "silver-wired."

Cranial Nerves.—III., IV., VI. Weakness of right internal rectus; drooping of right upper eyelid; right pupil larger than left; right, no reaction to light; left, faint to strong light. Both pupils react to convergence. V. *Motor*, normal; *sensory*, slight affection left side. VII. Slight weakness right side, general, passing off. XII. Tongue deviates to right when protruded; other movements all good. IX., X. *Soft palate: Volitional movement* abolished; *reflex irritability* completely abolished; *tactile sensibility* more affected than four weeks ago; *slight touches* not felt on either side; *forcible probing* felt and localized on right, not felt on left; touching on middle line felt on right. Electrical reactions of soft palate: *Faradism*, no response to moderate current; *galvanism*, twelve cells, KCC greater than ACC; no polar change.

Larynx.—Vocal cords slightly excavated, being, in quiet respiration, 4 millimeters apart. *On deep inspiration* not further abducted. *On phonation* come promptly together. *On deep inspiration* following phonation right vocal cord is moved outward a shade more than left; there are no ataxic movements of vocal cords. During examination had an attack of coughing with characteristic laryngeal stridor—inspiratory.

Motor system not affected; *sensory system*, slight analgesia ulnar sides of both upper extremities, a band across chest, and some change in legs; girdle sensation, numbness in tip of second fingers. *Reflexes, deep: arm-jerks* diminished; *knee and ankle-jerks* absent; *plantars*, indefinite, flexor; *organic*, some trouble in starting micturition; *swallowing* solids difficult, fluids not unless patient is in a hurry.

General Health.—Aortic second sound accentuated; *urine* low specific gravity, with trace of albumen; no hypertonia, no Charcot joint; no perforating ulcer; *nails more brittle*.

The point of interest in the case was, as stated above, the early and unusual implication of various cerebral nerves. It was, of course, well known that laryngeal abductor paralysis sometimes was one of the earliest, if not the earliest, sign of tabes, and might even be present at the time when the patellar reflexes were not yet lost. Sir Felix Semon had demon-

strated a case of that kind some years ago at the Laryngological Society, but he had never seen a case in which so complete a paralysis of the soft palate as that witnessed in this case was amongst the early symptoms of tabes; and, indeed, he did not remember, amongst the very many cases of tabes with laryngeal complications which he had seen, a single one in which paralysis of the soft palate had played any role.

The second point of interest was that, in spite of the complete motor paralysis of the palate, swallowing of fluids did not produce regurgitation through the nose when he drank slowly.

Thirdly, it was very remarkable that, seeing how complete the paralysis of the palate was, the tongue should, until a few days ago, have so completely escaped. As a rule, when there was paralysis of the palate and the larynx, there was a triad, the tongue being also, and often enough even preponderately implicated.

Fourthly, it was remarkable that there were considerable vacillations of the clinical symptoms, the paralytic phenomena in the tongue, the palate, the larynx and the eyelids being distinctly more marked on some days than on others.

Finally, it might be observed that the patient had had no laryngeal crises at any time of the illness, but that his breathing now at nights was distinctly stridulous and sonorous.

BOOK NOTICES.

Diseases of the Nose and Naso-Pharynx—First Part.

By Zarniko. Printed by S. Karger.

The widely known text book of Zarniko on Diseases of the Nose, now appears in its second edition. It is a characteristic book in the best sense of the word. Without neglecting the results of other experts, the author adds everything new that has appeared in recent years in his line to the bountiful harvest of his own practice. Through this subjective coloring of his subject, the author does not weary one even when discussing dry theoretical questions. References to literature allow the reader to make for himself an intelligent judgment. The anatomy is illustrated in clear and pertinent fashion, partly by schematic and partly by photographic cuts. In the physiologic portion, the sense of smell is given a careful discussion, something that is lacking in many text books. A third part is devoted to the general pathology and symptomatology. In special chapters, the author discusses the disturbances which result either from stenotic or unusually large noses, also the disturbances of the smell, speech and voice, and, finally the pathologic connection between nose, and the ear, eye, brain and other remote organs. In the fourth part, the general diagnosis, he discusses at special length the procedure in the ordinary nasal examination and in those cases where the more delicate examinations must be used. The practitioner who desires to investigate this territory of more delicate examination, will have many points for which to thank him. The last part treats, in a practical manner, of the general therapy. The special part will appear in the summer.

Lery.

Middle Ear Suppurations.

By Dölger, Munich. Published by T. F. Lehmann.

Since 1872, Bezold of Munich, has published triennially statistics concerning his clinical and private practice. The incomparable value of this work consists in the fact that it is published by a careful observer, who has not changed the classification of the different forms of diseases, and so we are able to compare the number in the last epoch with those of the preceeding 20 years. It is thus possible to give an objective judgment upon the value of certain methods of treatment. Dölger has published a critical and statistical portion of Bezold's work, dealing with the suppurations of the middle ear seen in the years from 1899 to 1901, which covers 140 pages. It is impossible to give the valuable contents in a mere abstract. It is of especial interest to compare the numbers of clinical and private patients and to observe the influence of neglect on the former. The author criticises very sharply the dry treatment of the ears by means of iodoform gauze tampons. Of 22 acute cases so treated, 9 developed complications; of 23 chronic suppurations, 13 went on to carious destruction. His boric acid powder treatment still seems the best method to him.

Levy.

Atlas and Epitome of Otology.

By Gustav Brühl, M. D., of Berlin, with the collaboration of Prof. Dr. A. Politzer, of Vienna. Authorized translation from the German, edited by S. MacCuen Smith, Philadelphia. W. B. Saunders & Co., Philadelphia.

It has been the object of the author to produce "an illustrated clinical handbook to act as a worthy substitute for personal instruction in a specialized clinic." That this object has been attained will be readily conceded upon examination of the book. The predominant feature of the work is the very complete exposition of the minute anatomy and pathology of the ear. This is portrayed by 244 colored figures, 39 lithographic plates and 99 text illustrations. These have been drawn with the utmost fidelity to nature are beautifully executed typographically. The second half of the

book is a concise text upon the anatomy, physiology and pathology of the organ of hearing. Though necessarily brief, it gives a valuable epitome of these subjects. The work will soon find its way to the library shelves of every otologist, and it will also meet extensive appreciation from general practitioners and students.

Diseases of the Nose, Pharynx and Ear.

By Henry Gradle, Professor of Ophthalmology and Otology in the Northwestern University Medical School, Chicago. W. B. Saunders & Co., Philadelphia.

The author has admirably fulfilled the intention, avowed in his preface, of presenting disease as he has seen it during an experience of nearly twenty-five years. He has endeavored to lay especial emphasis upon those diseases which cause the most anxiety to the physician and which are not always fully elucidated in text-books. Carrying out this plan, Dr. Gradle has produced an eminently practical work which is, in some respects, unique. There is a modest air and conservative tone throughout the book, which is in pleasing contrast to the cocksureness and dogmatism sometimes encountered. This feature is particularly observable in his remarks upon treatment. No therapeutic measure is recommended which has not been well tried by experience, "even though sanctioned by the tradition of text-books." Readers of the work may not agree with the author in all his conclusions, but they will be thoroughly gratified with his modesty and candor; and they will, doubtless, give unanimous commendation of the work.

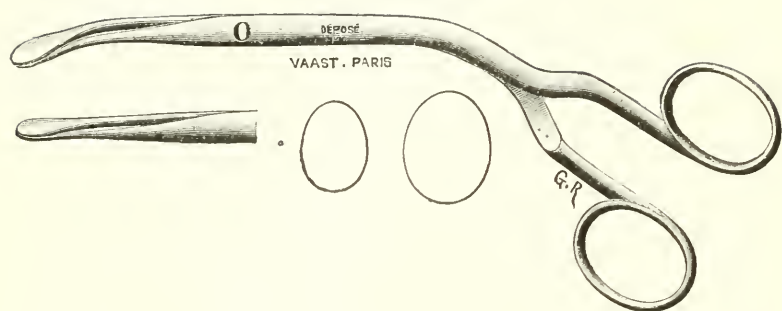
Nothnagel's Encyclopedia of Practical Medicine:

Diphtheria, By Wm. P. Northrup, M.D.; **Measles, Scarlatina, German Measles**, by Theodore von Jürgensen, M.D., Professor of Medicine at the University of Tübingen. Authorized translation from the German, under the supervision of Alfred Stengel, M.D. W. B. Saunders & Co., Philadelphia.

Those who are not sufficiently familiar with the language to avail themselves of German medical literature will welcome this volume of Nothnagel's Encyclopedia. The emi-

nence of the American editor is sufficient assurance that the matter is well worth while. With the exception of the article on diphtheria, the articles in this volume are taken from the original. Northrup's monograph is an excellent substitute for that of the German author. Northrup was associated, at the New York Foundling Hospital, with Dr. O'Dwyer, and his consideration of intubation, therefore, possesses especial interest and value. Von Jürgensen's historical notes on measles, particularly those on the Faroe Islands epidemic, are worthy of study. In every respect, the work takes rank with the best.

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XXXV.

MY LATEST IMPROVEMENTS IN THE RADICAL
TREATMENT OF CHRONIC SUPPURATIONS OF
THE ACCESSORY CAVITIES OF THE NOSE.

BY DR. LUC,

PARIS.

GENTLEMEN:—While accepting your amiable invitation to join this meeting of my American colleagues I could not forget the kind appreciation which my personal contribution to the radical treatment of the chronic suppurations of the accessory cavities of the nose found in your country, and I came to the conclusion that I could not better interest you than by submitting to you the result of my recent attempts and investigations in this special department of nasal pathology.

In this analysis of the modifications and improvements which I have been gradually induced to bring into my first methods I will successively consider the chronic suppuration of:

- A. The maxillary sinus;
- B. The frontal sinus;
- C. The ethmoidal cells;
- D. The sphenoidal cavity.

A.

At the outset of this first chapter allow me to say that I completely share the views expressed on the same subject by my colleague and friend Lermoyez in several of his publications:

1. That the surgical treatment is to be strictly limited to the chronic forms of the diseases.

2. That, as regards these chronic forms, a distinction is to be admitted between the properly called suppurative sinusitis caused and kept up by a primitive infection of the mucous membrane of the antrum, soon ending in a fungous degeneration of its tissue, and the maxillary empyema in which the pus did not originate in this cavity, but simply accumulated in it, its source being either a frontal or a dental abscess. In the latter case the sinusal mucous membrane may remain in contact with the pus, without becoming infected and undergoing the above mentioned degeneration, and a simple washing of the cavity, after previous suppuration of the source of the pus, may suffice to obtain a definitive cure.

Lermoyez's conclusion to which I was brought by my own experience is that it is not advisable to adopt the radical operation in any case of chronic abscess of the antrum without having previously attempted to cure it by one or rather several washings of the diseased cavity, after a puncture has been made in the inferior meatus.

Entering the subject of the radical cure of chronic maxillary suppuration, for which I proposed seven years ago a new operative method which has since then been successfully performed in nearly all countries, allow me to tell you that it bears the name of your countryman Caldwell, associated with mine. I have always been ready to acknowledge his priority, as regards the paternity of the concerned operation, but I was able to prove on many occasions that I had in-

vented my own proceeding in complete ignorance of the article in which Caldwell had described his method. Allow me to add that this article had passed nearly unnoticed in your country and that it was only brought to my knowledge, a whole year after the publication of my own description.

It is not my intention to renew this description here. I will only call your attention to a few technical details which were suggested to me by the experience acquired after operating on about a hundred cases.

My double aim, while performing the operation in question, is to make two large bony resections: the one at the expense of the anterior wall of the sinus, in order to obtain a wide but transitory communication between the sinus and the mouth, and to remove thoroughly the pus and the diseased mucous membrane, the other at the expense of the internal or nasal wall of the sinus, in order to create a wide and permanent communication between the antrum and the nasal fossa. This latter resection, which requires simultaneous ablation of the greatest part of the middle and inferior turbinals, is greatly facilitated by the introduction of the little finger into the nostril, which enables the surgeon to avoid any lesion of the septum and to ascertain that the free communication desirable has been obtained and that no fragment of the turbinal mucosa, likely to be in the way of the further drainage, has escaped the cutting forceps.

I cannot too much emphasize the fact that the antro-nasal communication must be a large and permanent one, whereas the antro-buccal one is only to last just as long as is necessary for the cleaning and curetting of the sinusal cavity. This operation has become such a current one in my practice that, for more than three years, I have left off keeping a regular statistical account of my operated cases, and I feel bound to say that, since I adopted the principle of substituting for the small artificial hiatus made on my first operated patients a large resection of the greatest part of the internal wall of the sinus, I have met no instance of any case, however chronic it may have been, that did not radically heal within a lapse of 4 or 6 weeks.

It was a great satisfaction for me to find my own results in accordance with the brilliant statistics presented last year

by my friend Lermoyez at the congress of Manchester.

I call your attention to the fact that the principle of this operation, which gave us such rapid, radical, and let me say, unheard of results, is based on a scrupulous regard for the laws of Nature, according to which the sinusal cavities are to communicate with the nose, but not with the mouth. My aim was then simply to substitute for the natural hiatus so unfavorably situated and so insufficient as regards its size, a considerable opening not amounting less than the third part of the wall at whose expense it is made, thus making of the maxillary a sort of lateral prolongation of the corresponding nasal fossa, likely to get cleaned as well as the latter, when the patient is blowing his nose. Not only were the results of his operation and satisfactory, but I dare say they were somewhat unexpected and caused some surprise especially in Germany, where the radical cure of suppurating cavities was based on the principles (suppression of the cavity or the epidermisation of its wall by means of epidermic laps) which were totally disregarded here.

The opportunity I had in two cases of reopening the maxillary sinus of patients previously operated upon by my method, and on whom a relapse had been wrongly suspected, enabled me to ascertain the mechanism of the cure thus obtained. In fact I found the sinusal cavity completely filled up with a sort of fibrous hypertrophy, which at the same time perfectly accounted for the permanent impermeability of the corresponding eye to light, when an electric lamp was put into the mouth, according to Herying's method.

A new proof, that principles, as well in surgery as in other things, are not eternal.

B.

It seems to me quite as superfluous to describe here the Ogston-Luc method for the radical cure of frontal abscess, as I thought it was to describe the Caldwell-Luc's operation in the preceding chapter, for the reading of your transactions showed me that both have been often performed in this country, and it is my conviction that they could find no better support than that given by the well known skill of American surgeons.

But, however strange it may appear to you, it is my chief aim, while alluding to the operation proposed by me years ago for the radical cure of the chronic frontal empyema, to point out its drawbacks and dangers, and allow me to say that I feel some pride at recording that I have been the first to lay stress upon its weak points.

Of course the principle on which it is based (immediate closing of the frontal wound after thorough cleaning of the sinus, and further and exclusive drainage through the nose) was most tempting, and it is a matter of fact that it was often crowned with a rapid and brilliant success, the patient quickly recovering with a hardly visible scar. But such were only the favorable cases, and it is our duty to consider more attentively the unfavorable ones, consisting in abnormal extension of the sinus quite out of proportion with the caliber of the fronto-nasal outlet entrusted with its drainage. The course of things too often observed under such conditions was the following: about the 20th day after the operation a swelling appeared in the operated region, ending with a spontaneous reopening of the wound with the formation of fistula, and with the necessity of a new operation.

The natural consequence of such accidents was to throw considerable disrepute on the method: in fact, while some surgeons remained faithful to it, others returned to the old practice of keeping the wound open for a while, and others adopted the method of Kuhnt, consisting in the total resection of the anterior wall of the sinus and in the consequent suppression of its cavity, without regard for the considerable disfigurement inflicted thereby on the patient.

Things were in this unsatisfactory condition when Killian proposed a new method which is a sort of combination of the Ogston-Luc and Sasen operation or rather a combination of the advantages of all three.

In imitation of the Ogston-Luc method it implies the immediate closing of the wound and the consecutive drainage by the nose. Like Jansen's method it opens the floor of the sinus. Like Kuhnt's it removes the greatest part of the anterior wall; but its chief originality consist: 1, in preserving between the two mentioned breaches a sort of bony bridge corresponding to the orbital arcade, which greatly

preserves the normal aspect of the face; 2, in extending the inferior bony opening to the ascending branch of the maxillary bone, which gives to the surgeon hitherto unknown facilities for widening the fronto-nasal outlet and curetting the ethmoidal cells.

Allow me to record here that I am the first to have done this operation in France and to recommend it to my countrymen. After obtaining complete success with it in the eight on whom I performed it, I feel bound to proclaim here that I regard it as being at present the surest and safest method for radical cure of chronic frontal suppurations in cases whose surgical treatment is made particularly difficult by abnormal dimensions of the sinusal cavity and especially by its extension to the temporal region, whereas the Ogston-Luc method, to which the advantage must be granted of an easier performance for the surgeon and of less disfigurement for the patient, finds its ideal application in patients favored with a sinus of small dimensions.

C.

With the exception of a dubious case in which the region of the middle nasal meatus presented itself rhinoscopically filled with creamy pus, while the frontal, as well as the maxillary sinus showed themselves perfectly permeable to transillumination, I have no personal record of a single example of an isolated ethmoidal suppuration, and I had consequently only to deal with this affection in connection with frontal or maxillary suppurations.

The ethmoidal labyrinth can be attacked either through the natural way of the nose, in a word, rhinoscopically, or thanks to its proximity to the frontal and maxillary sinuses, surgically, through an artificial breach, as a sequel of the radical operation for empyemas of the latter cavities. This is a subject to which I have always devoted special attention and regarding which the result of my personal experience may be of some interest to you. I will then successively consider the surgical opening of the ethmoidal cells: 1. Through the normal way of the nose; 2, during the maxillary operation; 3, during the frontal operation. A preliminary

point on which I beg to dwell here is that there is no possible hope of destroying completely the ethmoidal labyrinth through the nasal cavities. For, whilst the middle and even the posterior cells (including the sphenoidal cavity, which may be considered as the most remote of them) are within reach of our eyes and our instruments, I cannot say the same of the most anterior cells, that line the nasal-frontal outlet and which, in consequence of the extreme narrowness of this region of the nasal fossa, will always be sure to escape our reach unless we make a previous bony breach.

Therefore, while describing here the method of destruction of the ethmoidal cells, based on a new technic and instrumentation, which I have been using successfully for about two years for the radical cure of the nasal myxomas, I do not mean to present it to you as a means of radical cure for ethmoidal suppurations, but simply as a preliminary step to the fronto-maxillary operation, whose aim is to clear away the polypoid growths and hypertrophied parts of the mucous membrane, and thus facilitate the nasal part of the operation.

Another result of my experience has been to induce me to abandon entirely the use of the so-called nasal curettes for the removal of the hypertrophied, more or less myxomatous parts of the mucosa, as well as the bony cells themselves, after finding out how powerless those instruments are in both cases. I do not doubt that your own records based on your personal experience will make you share my conclusion, that the largest curettes which we can introduce into the nasal cavities while endeavoring to clear off myxomatous growths, simply penetrate their soft tissue without removing more than a few shreds of it, and that they have hardly better grasp upon the bony ethmoid walls, the greatest number of which, after breaking easily under the pressure of the instrument, remain hanging in the nasal fossa, and I need not remind you how quickly such attempts are checked by the abundant bleeding which prevents any further view of the field of operation.

I was then soon led to the practical conclusion, that the only instrument likely to deal successfully with the soft and easily bleeding myxomatous tissue, as well as with the honey-

combed bony tissue of the ethmoidal labyrinth, was best represented by a special forceps whose blades are large enough to seize much at a time and flat enough to be easily thrust into the deepest and narrowest recesses of the middle meatus.

I have the honor to present you here three specimens of different sizes of that instrument, which has been made according to my instructions by Mr. Vaast (of Paris). One or other of these is to be used according to the spaciousness of the nasal cavity and to the dimension of the piece of tissue to be extracted.

The technic of the operation is as follows:

If the nasal fossa is filled with abundant and pediculated myxoms, the first task is to remove the greatest number of them by means of the cold snare, until the middle turbinal becomes apparent. In case of persistent bleeding it is advisable, after plugging the bleeding region with dry gauze, to postpone the second part of the operation until the following day, when, the hemorrhage being checked, it will be possible to anesthetize duly the ethmoid region. This is best carried out by means of a long and thick strip of gauze, which, after being soaked with a solution of hydro-chlorate of cocain (1 to 5) with addition of a few drops of a solution of adrenalin (1 to 1000) is pushed deeply into the middle meatus. Another similar strip wet with the same solution is then inserted between the middle turbinal and the septum, and under the free edge of the former, and both are to be left in situ during at least ten minutes, when the region may be considered as thoroughly anesthetized and the surgeon may proceed to the really ethmoid part of the operation, after having prepared and keeping close to hand:

1. The three models of the above mentioned flat forceps.
2. A heap of long strips of dry gauze.
3. A long ordinary nasal dressing forceps, destined for the rapid introduction of the gauze after each application of the flat forceps.

In case of a bilateral affection, I consider it advisable to operate alternately on each side at the same sitting, valuable time being gained by the fact that, while the bleeding is

checked in one cavity, the curetting may be continued in the other.

The middle turbinal is to be first attacked with the largest possible type of flat forceps, whose blades are kept, during its introduction, sufficiently open to enable them to pass along each side of the turbinal and to be pushed as far as the insertion of the latter, when they are strongly pressed against one another, squeezing bone, mucosa and myxoms, then tearing them off with a rapid twisting movement. Before the bleeding has time to reproduce itself a new application of the forceps is made on the remaining part of the turbinal which, thanks to the large grasp of the blades, can be completely removed after three or four similar applications. One or two of the strips of gauze are then rapidly seized with the dressing forceps and thrust into the meatus, where they must be firmly pressed on the bleeding surface, and exactly fill up the place of the removed turbinal. After the lapse of a few minutes the gauze may be extracted, and the bleeding is then generally found to be sufficiently checked or diminished for the further curetting of the ethmoidal cells. Under the removed turbinal are generally discovered myxomatous masses which would have remained unnoticed but for the previous operation and which it is now an easy task to extract. I dare say that at this phase of the operation, after the middle turbinal has been mostly removed, the surgeon need not mind the hindrance caused by the bleeding, since he has henceforth to rely less on his sight than on his tactile sensation: any myxomatous mass, any brittle bony trabeculae met by the forceps are to be seized till the instrument finds no other resistance than that of the bony walls limiting the nasal cavity, which, are not likely to be interfered with by its blades. The only wall which I several times happened to open involuntarily is the anterior wall of the sphenoidal sinus, which in one circumstance showed itself a real representative of the most posterior ethmoidal cell. I must add that I had no reason for regretting this fortuitous extension of my operation, since it had no bad consequence for the patient, and led me unexpectedly to a new method for the opening of the latter cavity, whose description will find its natural place in the last part of this paper.

The method of ethmoidal curetting which I have just been describing has proved most efficacious for the radical cure of nasal myxoma independent of any neighboring suppuration, and has enabled me to cure completely after one or two sittings many a case which would otherwise have demanded much more time. If operated upon with the snare, according to the old proceeding, I may add that it left the patient far less exposed to relapses, thanks to the destruction of the greatest part of the ethmoidal cells, which further enabled the surgeon to detect any beginning myxomatous growth and to extract it easily on its very first appearance.

As I clearly stated on entering this chapter, the method just described, when applied to ethmoidal suppurations complicating a frontal or maxillary empyema, can but be considered as a preliminary step to the radical operation of the latter disease, since the Caldwell-Luc well as the Killian method afford the surgeon every facility for the opening and the curetting of the neighboring cells.

I have already had many opportunities of dwelling on this subject in various articles devoted to the question of the radical treatment of chronic maxillary diseases; but I feel bound to say that, as regards the curetting of the ethmoidal cells in connection with the radical operation of frontal empyema, no method seemed to be abler than Killian's proceeding to give the most radical and satisfactory results, thanks to the resection of the upper part of the ascending branch of the maxillary bone and to the large opening thus created exactly in front of the ethmoidal labyrinth, which it then becomes an easy task to open and destroy freely without any risk of the instrument penetrating the cranial cavity.

D.

Like the ethmoidal cells the sphenoidal cavity, in case of a chronic empyema not likely to be cured by such simple means as catheterism and washing, can be either opened by the rhinoscopic way or with the help of a previous artificial breach.

While discussing the choice of either of those methods, we shall have to consider: 1. The greater or less convenience

afforded to the surgeon by the spaciousness or the narrowness of the corresponding nasal fossa for an intra-nasal proceeding, 2. The coincidence or non-coincidence of an empyema of the maxillary antrum, the latter having been pointed out by Jansen, by myself and by Furst as offering the safest and easiest way to the sinus in question.

In case of the integrity of the maxillary sinus, the nasal way is only to be given up as being too narrow, if this narrowness cannot be corrected by an intra-nasal operation, for I need not say that such an obstacle as a projection or deviation of the septum ought to be previously removed.

When no more hindrances are left for getting at the sphenoidal front wall than the middle turbinal and the posterior ethmoid cells, I think there can be no simpler method for reaching and opening the concerned sinus than the one I described above for the intra-nasal curetting of the ethmoidal cells. It is a matter of fact that, while performing this curetting progressively and systematically from before backward with my flat forceps, the surgeon is naturally, and as it were, inevitably, led to opening the last of them which is nothing else but the sphenoidal sinus itself. Only in case of an abnormal resistance of the anterior wall of this cavity, it would be advisable to have recourse to a perforator, and the opening thus made should then be enlarged by means of a cutting forceps. This having been done, my flat forceps will prove again more efficacious than any other instrument and especially than the common nasal curettes for curetting the inside of the cavity, thanks to the breadth of their blades which clearly accounts for their firm grasp on the myomatous tissue, often enabling the surgeon to remove the totality of the degenerated mucosa in a single piece. I cannot too much emphasize the necessity of removing the greatest possible part of the front wall of the sinus for the same reasons which make me advise the largest possible resection of the internal wall of the maxillary antrum during the radical operation for empyema of this cavity, experience having shown what extraordinary tendency such artificial openings have to shrink and close up rapidly after the lapse of a few weeks.

The coincidence of an antral empyema with the sphenoidal suppuration should remove any hesitation as to the choice of

the best way to be followed in order to get at the sphenoidal cavity; the antral one being, as above emphasized, under such circumstances, the safest and the easiest.

As is often the case for little, as for great discoveries, it was by a mere accident that I was led to find (after Jansen, but thoroughly unaware of his contribution to this subject) this surgical way to the sphenoidal cavity. While curetting the posterior ethmoidal cells through a maxillary antrum, whose front and internal walls had been extensively laid open, I felt that my forceps were entering a very large bony cavity, which after due investigation proved to be the sphenoid antrum.

This proceeding has since then been the subject of very careful study on the part of my colleague and friend Furet, who came to the same conclusion as I: that the maxillary way, after a large resection of the anterior and internal walls of this sinus, is the most direct and the simplest to reach the sphenoidal cavity, and that owing to the complete harmlessness of this method, there should be no hesitation as to its adoption even in case of a complete integrity of the maxillary antrum, when the anatomical conditions of the nasal fossa leave no hope of getting at the sphenoid sinus by the nasal way.

XXXVI.

OBSERVATIONS ON THE DIAGNOSIS OF NASAL SINUSITIS.

BY WALTER J. FREEMAN, M. D.

PHILADELPHIA.

Most of the points to which I shall call your attention to-day are doubtless well known to all of you, but nasal sinusitis is so common, and the diagnosis of its exact location often so difficult, that I wish to emphasize the particular significance of certain signs as indications of its presence in one sinus or another. The frequent failure of the transillumination test renders it more than ever necessary that we should perfect and extend all other methods of examination. While the ease and rapidity with which this test can be used make it advisable that it should be employed as a routine measure, as by its means much valuable information and corroborative evidence may be secured, the reliance that has been placed upon it in the past has no doubt caused many a failure to recognize cases of inflammation of the antrum and frontal sinuses in which the physical signs were poorly accentuated. A point to be noted in this connection is, that the antrum, acting simply as a reservoir for pus from the frontal sinus, does not usually answer to the shadow test in transillumination, as pus alone does not hinder the transmission of light rays.

One of the greatest hindrances encountered in reaching a correct diagnosis is the fact that the sinusitis very frequently occurs in the narrowest side of the nose. This is in part due to interference with proper ventilation and drainage, such as we see in like conditions in the middle ear. The presence of polypi, which are almost always found in chronic cases, also frequently interferes with the detection of the cavity affected. Edema, or even congestion of the mucous mem-

brane in the immediate neighborhood of a sinus ostium is most significant and should draw our attention to this cavity.

As the disease progresses the membrane becomes more edematous, forming polypi, which Grünwald states are almost pathognomonic of sinusitis.

Taking up the anterior group of cells, comprising frontal sinus, antrum and anterior ethmoid cells, we come first to the frontal. The clinical history of the late morning headache; fullness over the eyes on leaning over; exquisite tenderness at the inner angle of the orbital roof, causing that characteristic shrinking even before pressure is applied, backed by the discovery of muco-purulent secretion at the peak of the vestibule, present a clinical picture sufficiently clear for an exact diagnosis. When, however, the disease is of less pronounced character, or when there is co-existing inflammation in some of the other sinuses, many difficulties in making even a probable diagnosis arise. In the absence of pain, usual where there is free drainage, our attention may not be directed to the frontal as the cause of a purulent rhinitis of reflex disturbances at a distant seat, but the persistent appearance of pus on the agger nasi or in the upper angle of the vestibule is so characteristic that a positive diagnosis of frontal sinusitis may be made from this sign alone. That pus from the frontal sinus tends to flow down over the nasi, and into the vestibule, rather than through the hiatus groove, is due partly to capillary attraction, the septum here being so close to the outer wall, and partly to the coincident swelling of the mucous membrane under the middle turbinal which prevents its escape in this direction.

In the diagnosis of antrum inflammation, whether acute or chronic, especially where there is only a small amount of discharge, no sign has stood me in such good stead as the discovery of pus flowing over the upper surface of the posterior end of the inferior turbinal. By this appearance alone my attention has been repeatedly called to cases of indolent or latent suppuration where there were none of the usual symptoms, and yet where most distressing and obstinate inflammation of both upper and lower respiratory tracts was evidently caused by the pus from this cavity.

Not infrequently also I have been able to make a tentative

diagnosis of sinusitis by certain well defined odors, those of sour pus and of sulphuretted hydrogen. These odors are very different from that found in antrum suppuration due to dental caries, the latter being more foul and clinging, and seldom noticed by the examiner. These patients are often mistaken for cases of parosmia, and may be reduced to the verge of melancholia, unwilling to come near anyone for fear of the odor being detected. The symptom of intermittent cacosmia is very significant of sinus suppuration, and the antrum will usually be found to be the cavity affected. In my experience, the continued presence of foul odor of the antrum secretion almost unerringly points to the teeth as the cause of the inflammation, and this would account for the frequency of its occurrence in antrum suppuration. An exception to this will be found in cases of diseases of any of the sinuses in which foul odor is due to syphilitic necrosis.

The presence of discolored molars or bicusps, even when they are not known to be dead, should always be viewed with suspicion, and the tests of heat and cold and of transillumination should be applied. The roots may not enter the antrum, and there may be no recognized alveolar abscess, but the presence of a carious tooth near the cavity may be the cause of repeated attacks of acute antrum sinusitis. A capped sixth year molar is always most suspicious, and before instituting any treatment of the maxillary cavity, the cap should be removed and the pulp chambers explored, although it should also be remembered that any tooth from the wisdom to the central incisor may be the cause of inflammation of the antrum. It may be that the examination of the root will reveal only a fetid odor, but the removal of the tooth should be insisted upon if the sinusitis does not quickly yield to treatment.

In endeavoring to wash the antrum through the normal opening, I have found it of value to explore first with a delicate cotton-wound probe, the point curved downward, as it thus enters the hiatus groove more readily, and after the opening has been detected and the correct curve attained, to fashion the curve of the canula exactly after it. A difference of a couple of degrees in the angle will often make the difference between success and failure in entering the cavity.

In this connection I wish to present an irrigation canula, made by Ferguson of Philadelphia, which has proved of great service to me. It is of hard rubber, and a second's heating enables one to fashion it to any desirable curve, and being elastic, it will often bend and conform to the irregularities of the surface and slip into the opening without injury to the delicate soft parts. Among other advantages over the metal tube are, that it does not cause so much discomfort, and that its lightness often permits one to allow it to hang in the sinus ostium while preparing solutions, powders, etc., to be introduced. In this way one introduction suffices to wash and medicate, when repeated introductions would cause additional pain and sacrifice time and patience. It has always been my custom to enter in the notes of each patient a drawing of the proper curve of the instrument, for there is such a variation in cases that much time is lost in seeking the proper angle anew at every visit.

In considering diseases of the ethmoid cells, I feel that I am treading on dangerous ground in expressing my opinions. While acute inflammation of these sinuses is one of the commonest conditions observed during the prevalence of grippe epidemics, I have yet to see a single exception to the rule that complete resolution takes place within a few weeks under appropriate local and constitutional treatment. That chronic suppuration of the ethmoid cells exists to the extent that certain statistics would lead us to expect, I cannot believe. Most of the cases I have seen have been inherited from other operators, and have been cured by treatment of a hitherto unsuspected antrum, frontal or sphenoid suppuration. I believe that most errors in diagnosis of ethmoidal trouble have been due to the false impression arising from probing in this region. As Zuckerkandl first pointed out, one readily obtains the feeling of bare bone where the mucous membranes are thin, as they are around the sinus openings. Woakes went so far as to claim that a special disease of the middle turbinal existed, to which the name of necrosing ethmoiditis was for a while applied, evidently being misled by the false impression of bare bone on probing, and the appearance of the bulging wall of the antrum. Time and again cases answering to his description have been brought

into consultation, and the so-called necrosing ethmoiditis has been cleared up by removal of the polypi and lavage of the antrum. By this irrigation many an unsuspected collection of pus will be found, which bulging the nasal wall inward and forcing the middle turbinal against the septum, would seem to give warrant for the removal of the turbinal. The cases of turbinectomy in which death has followed are lessons to be carefully heeded, for a fatal termination after operation seems more frequent than should be expected from the disease itself, as Semon states that brain complications are rare contingencies in ethmoiditis. Therefore, before sacrificing the middle turbinal, as is now done yearly in thousands of cases, it is due the patient at least to suspect the antrum and try irrigation, even if on account of the impossibility of reaching the normal opening it becomes necessary to puncture the sinus. Where pus is not immediately found on puncture and through irrigation, one should conclude that a failure has been made in diagnosis. The frequently repeated punctures, which are reported after a time to have demonstrated pus, must be viewed with the suspicion of having been the cause of the suppuration.

As regards the frequency with which disease of the antrum is overlooked, and ethmoid suppuration diagnosed, Lichtwitz found the former cavity affected 155 times in 243 of his cases, the ethmoids in only 11 cases. Comparing this statement with that of another well-known writer who found 150 cases of ethmoid disease, and who considers it "by far the most frequent of all diseases of the accessory cavities," and with the report of a more recent writer who found the ethmoids involved 44 times in 50 cases, it would seem that attention is still being directed too much to the ethmoids, and the antrum too much disregarded.

Except in atrophic rhinitis, or in rare cases of deformity of the septum with accompanying lack of development of the turbinals, the direct flow of pus from the sphenoid opening can seldom be seen. If viewed posteriorly, there is no certainty that the pus does not come from the posterior ethmoid cells, unless one accepts the assertion that secretion appearing at the upper part of the choanal arches is pathognomonic of sphenoid disease. Holmes in 50 cases found

the ostium of the sphenoid from 1 to 15 mm. from the opening of the posterior ethmoid cell, with an average distance of 5 1/2 mm. With such a short distance between the exits of the two cavities no one can make a differential diagnosis merely from the appearance of pus here. Edema or swelling of the mucous membrane at the upper portion of the septum posteriorly should direct our attention to the sphenoid sinus just as similar conditions in the region of other openings call for examination of the other sinuses. That the formation of crusts in the vault, as asserted by Schäffer and others, warrants a probable diagnosis of sphenoid disease, I believe to be misleading. So far as I have seen, except in cases of atrophy, pus from any of the other sinuses does not form into crusts, but rather excites an active flow of mucus and serum wherever it touches the mucous membranes. Why, then, should that from the sphenoid act differently? It is true that crusts are found in the nose and vault in cases of sphenoid sinusitis, but so are they usually present when the other sinuses are involved. This is due, not to the drying of the pus from the sphenoidal sinus, but to the collection of secretion as the result of inflammation of the mucous membrane caused by the irritating sinus pus. The same dry catarrhal inflammation will be found spreading to the pharynx and larynx in these cases, and will clear up as soon as the irritating character of the sinus discharge is modified by cleansing the affected cavity, even though the discharge from the sinus still continues. As to the probing of the sphenoid sinus, Holmes found in the examination of above fifty specimens that it would have been impossible during life in 61 per cent. This assertion, however, may yet prove to rank with that of Cryer, who states that the antrum cannot be irrigated through the normal opening, an observation known from daily experience to be false. An appearance which is apt to deceive one is the yellow color of the body of the sphenoid just within the choana. This so closely resembles pus that I have at times been unable to convince myself of my mistake until I had thoroughly cleansed the surface.

Vertigo and pain at the occiput, deep in the eyes and in the ears, may be caused by disease of any one of the sinuses, and the distressing pain across the bridge of the nose, con-

sidered so characteristic of ethmoid disease I have repeatedly caused by manipulations within the cavity of the sphenoid. Indeed, in sphenoid inflammations the close proximity of the 5th nerve to the lateral wall of the sinus and the nearness of the sphenopalatine ganglion make reflex pain to any part of the head possible by reason of the rich anastomoses of the branches. I have had cases where the frontal or the antrum were positively the only cavities involved, in which pus in these cavities would give rise to intense earache, sometimes of the corresponding side, sometimes of both together, the pain disappearing each time the cavities were irrigated. Again I have seen pain and edema of the orbital tissue arise when only the antrum was involved, though one might rather expect ethmoiditis. In one case, frequent attacks of pain in the mammary region, in another pain under the shoulder blade, were relieved only by washing the antrum. As to placing great reliance, therefore, on pain as pointing to the sinus involved, it seems well established that it cannot be done, although, on the other hand, absence of pain should not cause one to exclude sinusitis.

In regard to the ocular manifestations in diseases of the accessory sinuses, Posey says that general symptoms of asthenopia which are obstinate and not relieved by glasses, should direct attention to the nasal sinuses. He further states that a slight veiling of the edges of the optic nerve with a dilatation of the retinal veins and a choking of the lymphatics around the central vessels of the retina occur in latent cases of sphenoid sinusitis, while in severe cases the ordinary signs of optic neuritis are present.

When the drainage is abundant and the turbinal swollen, a positive diagnosis of the special cavity affected is at first often impossible; but by thorough contraction by cocaine and repeated cleansing by anterior and posterior syringing, one can usually arrive at a fairly accurate diagnosis by watching the flowing pus make its reappearance at the characteristic locations. This washing should be done so that the water may be caught in a black basin, for by this means one may obtain really valuable hints as to the quantity and consistency of the nose and throat secretions. The use of suprarenal extract is not advisable in examination for sinus suppura-

ration, as the blanching of the surface prevents the recognition of small amounts of secretion. A point I have found of value in carrying out the Fränkel and other position-tests, is to have the patient close the opposite nostril and sniff and blow alternately. By this means the pus is rapidly drawn from the sinus, and much time saved. Where there is difficulty in detecting the affected cavity by reason of the small quantity of pus, the patient should be examined early in the morning before the sinus has emptied, or late in the evening when the sinus, drained, it may be, during the night, has had a chance to refill. The morning is favorable for detecting pus from the frontal and ethmoids, the evening for secretion from the antrum and sphenoid.

XXXVII.

DISEASES AND TREATMENT OF THE SPHENOID CELLS, WITH REPORT OF CASES AND PRESENTATION OF INSTRUMENTS.

BY ROBERT C. MYLES, M. D.,

NEW YORK.

The subject of sinusitis of the sphenoidal cells was treated in an able and instructive manner by Dr. Hinkle before this Association in 1902. I will be brief, therefore, in my remarks and in my report of some of my cases. Everyone who has had much experience in dissecting and making sections of heads, agree concerning the great irregularity in size and position of the sphenoidal sinuses. The surgical anatomy concerns us most, and this is embraced chiefly in the area of the anterior upper wall. It is through this region that the normal secretions issue, and it is also through this space that we operate to secure proper curettage, drainage and admission of air. I present a wet specimen which demonstrates the normal opening, with the sphenopalatine artery as it passes across the operative field. The internal carotid is shown lying against the thin external wall, where it can easily be wounded by the slightest deviation from the narrow, surgical path. These cells are frequently affected by acute inflammatory processes, caused by invasion of bacteria which become more or less completely pent up.

The extent of the pathological condition depends upon the virulent activity of microbes present and the amount of obstruction in the normal opening. The gummatous changes of syphilis occasionally destroy part of the sphenoidal cells. The destructive softening processes of the gumma make it rather easy to perform whatever surgery may be indicated. The sphenoidal cells are more frequently diseased than we are taught to believe. If the method of diagnosis is adopted, which requires that the condition of every part of the nasal fossae, as well as that of every accessory sinus, should be accounted for as far as our skill and art will permit, we will have

more cases of diseased sphenoidal cells to report. When muco-pus is seen in the superior meatus or between the middle turbinal and the septum, the probe and cleansing swab should be used until the secretion is traced to its origin. Sometimes it will be necessary to remove the posterior half of the middle turbinal before the proper investigations of the region can be carried out.

I think we are often too conservative, when serious disease is suspected, in not removing this body earlier and more frequently. The soft silver probe should be used after proper cocaineization and when the natural opening has been found in the latest cases, the probe should be passed in and out, with hope of drawing some of the pus with it. When the diagnosis has been made and the character of the case approximately determined, we should endeavor to make an opening of 10 to 15 millimeters in the anterior superior wall. The section should commence at the lower border of the natural opening and extend downward in a vertical line, rather close to the septum. I present a series of instruments for your inspection and consideration, and sincerely hope, that, with continued efforts, we will be able to secure safer and more effective instruments for this operation. I regret that an error occurred in the preparation of this title of my paper for the programme. I intended it to "read with report of cases and presentation of instruments." I have selected two cases, which present interesting types.

CASE I.—This was a young man 30 years old, who gave a history beginning several years back. He had suffered from pain in the temporal, occipital and frontal regions, and also back of the eyes and throughout the space of the accessory sinuses. There was a peculiar degenerative process going on in all of the nasal sinuses, except the left antrum of Highmore, the left posterior ethmoidal cells and the left sphenoidal sinus. The pathological changes seemed to resemble granulation more than polypoid tissue. In certain areas the granulations were so large that sarcoma was suspected, but the microscopic examinations demonstrated only true granulation tissue. The right sphenoidal cell was constantly full of pus, which was in a state of fetid decay. After the middle turbinate had been removed, an opening was made in the anterior

wall of the sinus, a few millimeters beneath the natural opening. The wall was penetrated with a small gouge. Then the aperture was enlarged with curettes and cutting forceps until the vertical diameter was about 15 millimeters in length. The sinus was carefully curetted over the lower and inferior walls, which were covered with large polypoid granulations and putrid debris.

There was an immediate improvement in the profound depression from which the patient had been suffering, and



No. 1. Guarded Hand Drill.



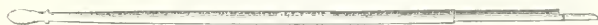
No. 2. Protected Chisel.



No. 3. Guarded Hand Chisel or Drill.



No. 4. Guarded Trephine.



No. 5. Guarded Electric Drill.

the pain which had been vaguely located in the deeper central part of the head gradually disappeared. Repeated curettage was necessary. A membranous band formed over the opening which was easily removed and without pain. The hole is now permanent and is about 12 millimeters in diameter. The sinus can be inspected and is perfectly well. All of the other diseased cells were treated by the radical operative method, and are in good condition, with the exception of the occasional occurrence of a little muco-pus in two of them.

CASE II.—The patient was a man aged 22 years who suffered from atrophic rhinitis associated with empyema of the ethmoidal and sphenoidal cells, those on the left being the most seriously diseased. The pain was most severe directly posterior to the left occipital regions. His mind was gradually becoming affected. He was losing weight steadily and he in-

sisted that I should perform a radical operation. There was a copious flow of pus which was decidedly fetid. I removed the posterior half of the partially atrophic middle turbinal and the floors of the left posterior ethmoidal cells. The discharge diminished. Most of the pain disappeared. A free inspection of the natural opening of the sphenoidal cell was secured and a small accessory opening cell was found, situated about 1-3 of an inch below the normal opening near the outer wall. While using the soft, silver probe some ugly pus issued through it. I enlarged this opening with a long trephine and the small forceps and curettes for further enlarging the aperture. The cavity was cleansed and dressed with aristol and boric acid. The patient did well and improved for nine days, when he had a violent hemorrhage. The patient stated that from two to three pints of blood were lost within ten minutes. My assistant visited him and reported that there was evidence of his having lost considerable blood. As the bleeding had stopped no tampon was used. I visited the patient on the afternoon of the 12th day after the operation and found him quietly sleeping. When awakened he jumped up suddenly and blood gushed from his nostrils and mouth so rapidly and in such a quantity that I immediately suspected the carotid artery. Between one and two pints were lost in less than five minutes. Tampons saturated in tanno-gallic acid solution, which were fortunately already prepared, were rapidly and firmly placed in position, in and over the sphenoidal wound. The patient was removed in a carriage to the Polyclinic Hospital. The writer accompanied him because he had no confidence in the hemostasis. The patient suffered from prostration and discomfort caused by the packing. On the 15th day after the operation the packing was removed, but this was followed by a slight flow of blood. During the night another hemorrhage similar to the previous one occurred. The house surgeon tamponed both nostrils and the posterior nares. Very thin blood with but slight power of coagulation, continued to ooze through the tampons. The patient was gradually losing strength. The pulse was rapid and very weak. It was not considered safe to administer an anesthetic, so I asked Dr. J. A. Bodine to tie the left external carotid by his hypodermic cocain method

using 1-10 per cent. solution. There was no manifestation of pain during the procedure, except when the cocain was being introduced, and when an enlarged cervical gland was touched. A catgut ligature was left in place around the common carotid artery for 24 hours, after the ligation of the external carotid, for the purpose of controlling any bleeding that might occur from the internal carotid. The packing was gradually removed during the next 3 or 4 days, and though considerable oozing occurred after each disturbance of the tampons, there was no alarming hemorrhage. The patient after several weeks of slow convalescence commenced to improve rapidly and now weighs about fifteen pounds more than he did at the time of the operation. I saw him a few weeks since and could find no pus in the sphenoidal cells. Several cases somewhat similar to this one, have been reported and it is a question in the minds of the operators as to which artery was to be considered responsible for the hemorrhage. Another important question is whether we should permit patients who have been operated on for sphenoidal disease to pass from under our control for at least three weeks after the operation.

DISCUSSION ON THE PAPERS OF DRs. LUC, MYLES AND FREEMAN.

DR. J. N. BRYAN called attention to a specimen he wished to present which showed a peculiarity of the sphenoid sinus, which was unusually large and extended down into the pterygoid process. If entrance to the sphenoidal cells had been attempted in this case through the antrum, the lower extension of the sphenoid would not have been reached.

DR. EMIL MAYER stated that he would like to express to Dr. Luc his very extreme pleasure at having been able to hear the classical paper he had presented, and in this connection he wished to express his grateful appreciation for the long journey he had taken to be present at this meeting, and he believed that he voiced the sentiments of his associates. Dr. Luc's work had been largely copied in America and in most instances where operations on the antrum of Highmore and the frontal sinus are performed, those known as the Ogston-Luc and the Caldwell-Luc are the ones most frequently performed.

He was especially pleased to note that when washing of the antrum of Highmore was spoken of by Dr. Luc that he said he punctured and then washed out. Ordinarily washing out of the antrum of Highmore through the natural openings is a practical impossibility, that is to say, that while the canula may be introduced into the natural opening and some fluid forced into it, yet thorough drainage becomes a practical impossibility. To enter the antrum of Highmore the canula would have to have the shape of a shepherd's crook, hence the speaker preferred puncturing in those cases where treatment was necessary.

In removing the middle turbinate, the method most in vogue with us consists in first removing with the Holmes scissors, the enlarged cell, and there he could readily see the advantages of the instruments here presented by Dr. Luc.

Regarding the treatment of the sphenoidal sinus, it has been shown over and over again that the sphenoidal sinus may in most instances be reached best by way of the antrum of Highmore and the ethmoid cells; thus each step of the operation could be carefully watched and the entire operation done in a surgical manner, and the speaker believed that ultimately the operation on the sphenoidal sinus would be done in this way. He had seen Jansen enter the sphenoidal sinus frequently in this way and the manner of procedure had struck the speaker as being rational, as complete control of the field of operation was thus obtained. In this connection the speaker presented an instrument for retraction of the cheek (instrument shown). The advantages were that it would not slip and afforded a most admirable exposure of the field for operation and dressing.

DR. T. J. HARRIS referred to his experience with Dr. Luc's method in frontal sinus disease. His results at first had been excellent; later less so.

He had carefully studied Killian's operation and thought the removal of the lower inferior wall of the frontal sinus would be found difficult. It was the difficult step of the whole procedure.

Concerning the function of the antrum and its relation to intranasal secretion, he would say that whenever he found pus in the nose he suspected antrum disease. He daily used

the Myles antral trocar and found it a most useful instrument.

DR. GORDON KING enumerated the various operations on the frontal sinus and expressed his preference for the modified Caldwell-Luc method, but even after this method of operation there were difficulties to be overcome. The drainage opening into the nose was apt to close up before the sinus was healed and it was on this account often necessary to reopen the wound. He was in favor of the Kuhnt operation except for the great facial deformity caused thereby.

He mentioned a case of double frontal sinusitis in which both of the sinuses were very large and in which the sinus condition was aggravated by the presence of an orbital abscess. In this instance he had done an operation which was essentially a combination of the various methods mentioned in the present discussion, a Kuhnt-Ogston-Luc operation with drainage into the nose and the removal of the anterior wall of the frontal sinus and implantation of the flap against the posterior wall of the sinus. In this case there had naturally followed the customary deformity of the Kuhnt operation, but the ultimate result had been satisfactory.

Dr. King called attention to the fact that a temporary infraorbital neuralgia sometimes followed the Ogston-Luc method, and wished to know if Dr. Luc had ever observed such a result in his experience.

DR. J. W. GLEITSMANN called attention to the fact that in 1895, at the meeting of the Association in Rochester he had reported a case of severe hemorrhage following operation on the sphenoid. He advocated the application of liquid vaseline to tampons left in this region before removal of the latter was attempted.

He also called attention to the fact that at that same meeting he had stated that the distance through the anterior nares between the middle turbinate and the septum, to the anterior wall, was three and one half (3 1-2) to four (4) inches and to the posterior ethmoidal cell six and one quarter (6 1-4) inches. He was now speaking of chronic cases, for in acute disease the anterior wall was as a rule not corroded. He had, however, recently seen a case of a slender man six feet tall, in

whom the antero-posterior distance from the tip of the nose to the sphenoid, was five and three quarter (5 3/4) inches, There consequently could be no invariable rule as to this distance.

DR. J. H. BRYAN asked if there had been much tendency in the antro-sphenoidal route to closure of the openings made.

DR. LUC replied in closing that he had not noticed any tendency to closure of the openings made in the antro-sphenoidal method. He expressed his harmony with the views of those who favored large openings—in order to cure well we must see well, and large openings allowed better treatment of the bleeding. It was difficult to resect the floor of the frontal sinus, but after incision and along the anterior edge of the wound we have a complete view of the floor.

Killian's operation was of great importance. We have to choose between the open method of wound treatment of a suppurating cavity and the closed method with disfigurement of the patient. An unexpected result followed in one operated on with Killian's method. It was a rise of the fatty tissue in the orbit helping to support and maintain the general contour of the face. In this way we could suppress the cavity and retain facial symmetry.

The introduction of the finger is of the greatest importance and we should carefully follow along the anterior part of the bony bridge so as to know just what we want to do, hence we establish complete drainage between the nose and the frontal sinus.

Replying to the inquiry of Dr. King, he stated that he had not found neuralgia following his operations. For a while the tissues about the frontal and maxillary sinuses were devoid of their usual sensibility, but there was no neuralgia.

DR. R. C. MYLES was always glad to follow the methods of Dr. Luc. He relieved antral irrigation through the natural opening quite feasible and in this matter would have to take issue with Dr. Mayer. In a healthy sinus irrigation might not be possible, but wherever there is an extensively diseased condition the hiatus semilunaris is usually pressed inward and thickened and a canula with the proper curve will generally reach the antrum.

DR. FREEMAN in closing said he entirely agreed with Dr. Myles that the ostium maxillare was more readily probed when the sinus was diseased than in the normal state. This is due to the bulging of the wall inward and to the unfolding of the hiatus groove. As a rough estimate, he thought that in four-fifths of such cases the cavity could be irrigated, and that some could be cured by this method alone. Of course where there were granulations or polypoid degeneration of the lining membrane, irrigation alone would prove of little value.

XXXVIII.

A BONY CYST IN THE ANTRUM OF HIGHMORE.

By C. G. COAKLEY, M. D.,

NEW YORK.

Large bony-walled cysts that completely fill the cavity of the maxillary antrum are of such infrequent occurrence that the writer thinks the case reported may prove of interest.

H. G. A., female, aet. 29, born in Scotland, remembers that when 9 or 10 years of age, she had a swelling appear on the face just beneath the left side of the nose. At or about the same time a lump appeared on the roof of the mouth to the left of the median line. To the best of her recollection neither swelling was painful. The swelling on the face gradually subsided after the left median incisor was extracted. At the present time there is but one incisor tooth in the upper jaw on the left of the median line, and there has been but one since the extraction above mentioned. The lump on the hard palate has persisted as a painless one all these years, merely giving some annoyance during mastication and phonation.

About two years ago the second bicuspid tooth of the upper jaw on the left side pained her considerably, and accompanying it there was a marked swelling over the anterior surface of the left antrum. This tooth was extracted, the pain subsided, but the swelling persisted.

In January, 1903. Miss A. contracted the grippe. In addition to the usual symptoms of the disease the patient noticed a great increase in the swelling on the face and on the hard palate. The patient could swallow only with difficulty on account of the mechanical impediment that the latter mass offered. The increase in size was not accompanied by any pain. There was no nasal obstruction, nor any evidence of

a difference in the character or amount of secretion in either naris.

Dr. Lindenbaum, of Jersey City, in order to relieve the dysphagia, incised the mass on the hard palate. After the knife had penetrated about an eighth of an inch of soft tissue it entered a cavity from which there escaped a thick, light yellow, turbid, inodorous fluid. The amount was about "two tablespoonfuls." The immediate relief was great, but at the end of 48 hours the mass and the attendant discomfort were as great as ever. Repeated incisions at intervals of two or three days were practiced for about a month, when it was noticed that the discharge had become much thinner and of a decidedly foul odor. The swelling on the face over the antrum kept increasing and became painful. The gingivo-buccal fold bulged outward and incisions were also made into its most prominent part. The discharge had the same appearance and foul odor as that obtained from the palatal incisions.

At the end of a month of this treatment, the patient not having improved, Dr. Lindenbaum referred the patient to me on March 5th.

EXAMINATION.

The patient's left side of the face is greatly swollen and tender, but not discolored. An ovoid, tense, and slightly red mass occupied the entire left half of the hard palate, the lower surface of which was convex instead of concave. It extended beyond the median line to the right, spreading over about half of the hard palate on that side. The gingivo-buccal fold was bulged outward by a hard mass. In it, opposite the first bicuspid tooth, there was a small fistula from which oozed on pressure a few drops of offensively smelling pus. The nares, both anterior and posterior, were normal with the exception of a slight bulging on the floor of the left, just within the vestibule.

Transillumination of the face showed complete darkness on the left side, even down to the level of the teeth.

A probe inserted into the fistula readily entered a large cavity. A canula was next inserted into the cavity through the fistula and the cavity irrigated with normal saline solution. Considerable pressure was needed to get a return flow, the irrigation fluid mixed with pus returning around the side of the canula. None of the fluid passed into the naris.

The patient was advised to enter Bellevue Hospital for operation. This she did on March 6th, and on the same day, under ether administered by Dr. Creevy, by the Crile method, I made an incision two inches long in the gingivo-buccal fold parallel to and one-fourth of an inch above the lower border of the gums. It was practically impossible to strip up the periosteum from the anterior surface of the superior maxilla, as the two were so intimately adherent and the bone so thin and porous that the elevator kept penetrating the cavity. I reached my index finger through the wall which was more like a pyogenic membrane filled with bone salts than anything else I can liken it to. The finger reached the level of the orbit, and passed beneath the anterior third of the nose as far as the middle hard palate. My opening was enlarged until it was about an inch in diameter, and I proceeded to curette the cavity. The material that came away had much the appearance of that found in chronic empyemata of the antrum, viz.: grayish, gelatinous, polypoid masses. The hemorrhage was considerable. On seizing some of this tissue with a forceps, a piece of the lining more than an inch square came away from the vault. It retained its dome-like shape and was found to have a thin bony wall. Several other pieces not so large, were similarly removed. The greatest difficulty was experienced in clearing the anterior wall of the antrum on account of the intimate adherence to the muscular tissue. No bone was encountered in curetting the prolongation under the nose and in the hard palate. When scraping in the latter region, the curette at one place entered the floor of the nasal cavity. The wound was packed with a long strip of iodoform gauze. This was removed at the end of 48 hours, the cavity irrigated with normal saline and repacked. This procedure was repeated at intervals of two or three days for about two weeks. The patient left the Hospital on the tenth day after the operation.

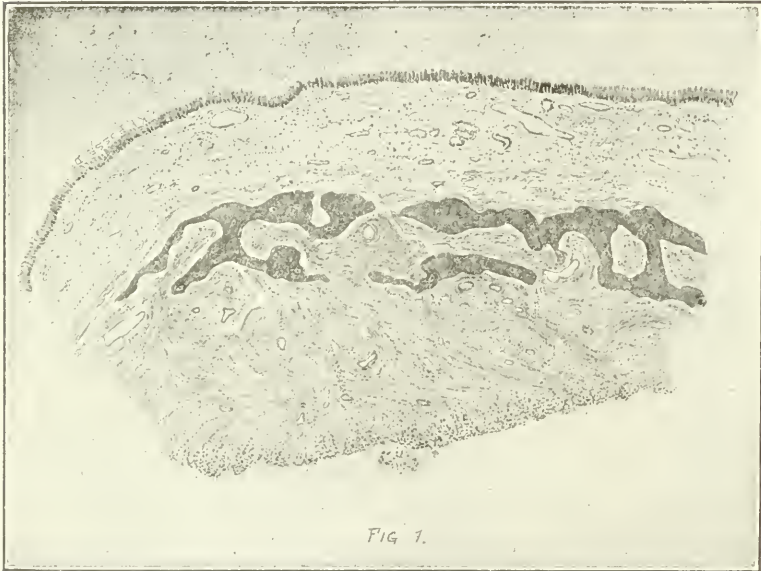
The subsequent treatment has consisted in repacking the cavity, without irrigation every three or four days.

MICROSCOPICAL EXAMINATION.

The large dome-like piece of tissue removed was placed in 4 per cent. formalin solution for two days, then decalcified in sulphurous acid, washed, re-hardened, and cut. Fig. 1 is a drawing made from a portion of the sections. Near the center can be seen a lamella of bone, somewhat irregular in thickness. At one place there is noticed a break in the continuity of the bone. This is of frequent occurrence as we look over the various sections. Above the bone will be seen the normal mucous membrane of the anterior antrum. My belief is that this is really that part of the mucous membrane

of the antrum that formed the floor of the antrum. That with the growth and enlargement of the cyst it was carried up before it. It is rather remarkable this membrane shows no signs of inflammatory involvement, although in such close proximity to a cavity filled with foul pus for a month at least. The cilia on this membrane even are well preserved.

On the opposite side of the bone is shown the deeper structure of the lining membrane of the cyst proper. It consists of a not very dense connective tissue with moderate round cell infiltration. Blood vessels of various sizes are

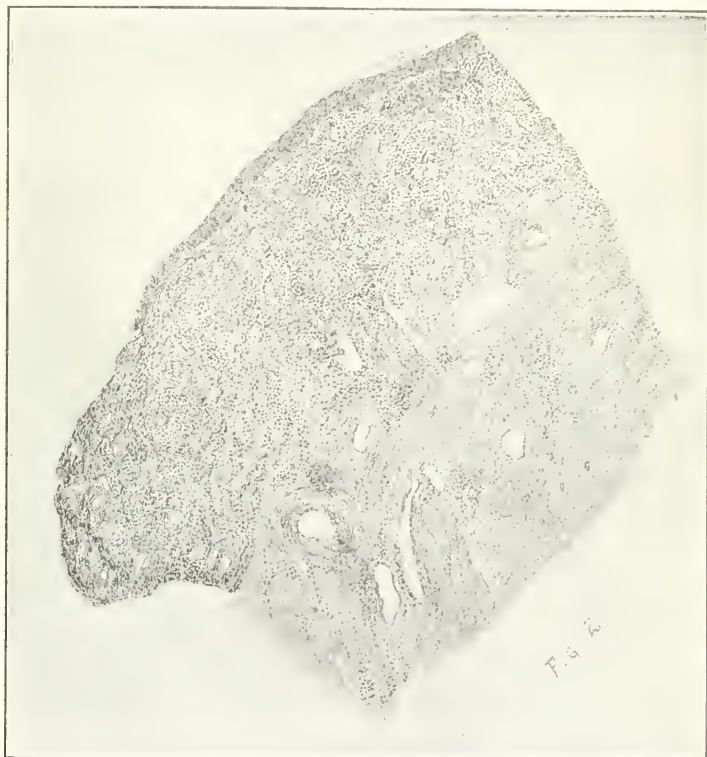


quite numerous, but no glandular structures are to be seen. Only a portion of the cyst wall remains attached to the bone, the superficial portion having been removed in the earlier curetting.

Fig. 2 is a section slightly oblique, from the curetting of the cyst. Its lower portion has a structure like that attached to the bone in Fig. 1. Its superficial portion is much more densely filled with round cells. Again no glands are found. In this respect the lining of cysts of dental origin differ from the polypoid hypertrophies of the mucous membrane of the antrum found in chronic empyemata of the antrum. The epithelial lining is seen to be of flat cells, arranged in two or three layers.

A most exhaustive study of dentigerous cysts was made

by Magitot. His researches appear in the *Archives Generales de Medicin*, Vol. II, 1872, pp. 399-414, and pp. 681-699, also in Vol. I, 1873, pp. 155-174. It seems probable that in our case we had a cyst forming from the root sack of the left upper median incisor. That it first invaded the hard palate, pushed its way under the nasal cavity, and finally invaded the antrum. The root of the second bicuspid prob-



ably pressed upon, its circulation interfered with and thus diseased. The irritation from this diseased tooth produced an increase in the secretion of the sack and a considerable increase in its size. On the extraction of this tooth the cyst remained quiescent until the attack of grippe caused such an increase in the fluid as to get the patient to seek relief from the mechanical effect. With the entrance of pus producing germs through the incisions about a month later, the pain, mild sepsis, and fetid discharge kept up until the time of the operation.

XXXIX.

THE MICROSCOPICAL EXAMINATION OF THE DISCHARGE IN ONE HUNDRED CASES OF MIDDLE EAR SUPPURATION, WITH AN ANALYSIS OF THE RESULTS, HAVING SPECIAL REFERENCE TO THE PRESENCE OF TUBERCLE AND "ACID-FAST" BACILLI.*

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This investigation was undertaken not with the view of making an exhaustive bacteriological search, but chiefly with the object of testing the value and reliability of microscopical examination for acid-fast bacilli available under ordinary circumstances.

The sources of the material were for the most part patients who had not previously undergone any special treatment, and although many of them afforded family and personal evidence of tuberculosis, they were not perfectly selected for that reason, but were taken in the ordinary course of out- and in-patient practice at the Central London Throat and Ear Hospital, together with a few private cases. Mr. St. George Reid, the bacteriologist, kindly co-operated in verifying the morphological characters of the micro-organisms.

Collecting the Material.—Having experienced the unreliability of scrapings taken from the superficial regions of the auditory meatus, the discharge was always taken from the deepest available part, as near as possible to the diseased area. In some instances the granulations themselves, with the pus and débris, were triturated with a 2 per cent. solution of sodium sulphate, and centrifuged before staining.

*Communicated to the Otological Society of the United Kingdom February 2, 1903, in opening a discussion on "Tuberculosis of the Ear, the Nose and the Naso-pharynx."

<i>Age</i> —Under 1 year	-	-	-	-	2
2 to 6 years	-	-	-	-	6
7 to 14 "	-	-	-	-	21
15 to 21 "	-	-	-	-	29
22 to 31 "	-	-	-	-	18
32 to 51 "	-	-	-	-	14
52 to 62 "	-	-	-	-	1
<i>Sex</i> —Equal in number.					
<i>History of Phthisis</i> , family or personal	-	-	-	-	42
<i>Acid- and Alcohol-fast bacilli</i>	-	-	-	-	24
B. T. (presumptive)	-	-	-	-	17
Pseudo-B. T.	-	-	-	-	7
Of the 17 B. T., 12	had history of phthisis.				
" " 5	had no history of phthisis.				
Of the 7 P. B. T., 5	had history of phthisis.				
" " 2	had no history of phthisis.				
<i>Squames and Pus Cells present together</i>	-	-	-	-	41
<i>Squames alone</i>	-	-	-	-	21
<i>Pus alone</i>	-	-	-	-	38
<i>Bacteria:</i>					
Staphylococci	-	-	-	-	41
Diplococci	-	-	-	-	20
Streptococci	-	-	-	-	7
Bac. proteus vulg.	-	-	-	-	14
Mic. tetrag.	-	-	-	-	4
Bac. coli.	-	-	-	-	3
Gonococci	-	-	-	-	3
Bac. subtilis	-	-	-	-	2
Aspergillus nig.	-	-	-	-	1
Leptothrix	-	-	-	-	1
Diphtheria (Klebs-L.)	-	-	-	-	1
Yeasts	-	-	-	-	1

Routine Staining.—The discharge was removed with a small curette, squeezed between sterilized cover-glasses, and fixed by heat. After boiling in carbol fuchsin for three minutes the smear was placed in 25 per cent. sulphuric acid until all color had disappeared; but if on washing with water the color reappeared the acid bath was repeated. After further washing in water, if apparently colorless, it was soaked in absolute alcohol for five minutes counterstained with

methylen blue, washed, dried, and mounted in xylol balsam.

Although this process may be carried out while the cover-glass is held by Cornet's forceps it will be found that the details can be more thoroughly and as quickly performed in a test-tube, using a liberal supply of solutions.

Specimens from the same cases were also stained by Gram's method, which proved more reliable than methylen blue as a general stain. They all resisted the action of 5 per cent. solution of tartaric acid after prolonged soaking.

SYNOPSIS OF TABLE OF RESULTS.

On referring to the table (pp. 6-8) it will be seen that the cases were all suffering with chronic suppuration of the middle ear with the three following exceptions:

No. 50 was one of chronic non-suppurative disease of the middle ear in a patient suffering with pulmonary tuberculosis.

No. 52 was that of an infant ten months old suffering with mastoid abscess and a discharge of four days' duration, under Dr. Jakin's care. The abscess and discharge both contained gonococci.

No 76 was also that of an infant twelve months old with a discharge of five days' duration. This also contained gonococci.

It will be seen that in twenty-four cases bacilli which resisted acid and alcohol were present. Of these seventeen conformed to the morphological characters of the bacillus of tubercle, and, further, were accompanied in twelve instances with either a personal or family history of tuberculosis. These are described as presumably genuine tubercle bacilli. The remaining seven cases showed bacilli varying in several respects (size, shape, etc.) from the orthodox features, although affording the correct staining reactions, and are grouped as *Pseudo-tubercular*, as suggested by Pappenheim. In these also there was a history of tuberculosis in four cases. The number of bacilli present in each smear varied considerably, from twelve in each field to less than a dozen in a whole smear.

We now know that all acid-fast bacilli are not necessarily tubercle, and in considering their significance it may be well to enumerate some of the chief non-tubercular acid- and alcohol-fast bacilli which have been reported.

1. *Smegma bacillus*.—This is acid-resisting, but is readily bleached by alcohol—less so by acid. It is smaller than that of tubercle, and is said to be found only on the male genitals.

2. *Leprosy Bacillus*.—This may be disregarded in the present investigations, owing to its rarity in this country.

3. *Timothy and other Grass Bacilli*.—Resist both acid and alcohol, but in inoculation experiments have proved negative.

4. *Lustgarten's Bacillus of Syphilis*.—The identity of this bacillus has not received satisfactory confirmation. It, however, is easily bleached by acid—less so by alcohol.

5. *Butter Bacillus*.—This is probably identical with a grass bacillus.

6. *Bacillus of Pulmonary Gangrene*.—This has been described by Pappenheim* as a *Pseudo-tubercular bacillus*, while Fraenkel† attributes its resistance to acids, to the putrefactive changes being rich in fatty acids, etc.; for when occurring in sweet sputum they give up their stain readily.

7. Lubarsch‡ also found similarly selective bacilli in: (a) Purulent bronchitis; (b) bronchiectasis; (c) abscess near hip-joint; (d) sebaceous cysts; in all of which cases inoculation results were negative.

8. Folli§ found acid-fast bacilli in three out of six cases of non-tubercular pulmonary gangrene. He observed that 5 per cent. solution of tartaric acid, while genuine tubercle bacilli required twenty minutes. This reaction I have not been able to confirm, as already mentioned.

In addition to these, there are many others which are referred to in the appendix.

*Pappenheim: Brit. Med. Jour., June 14, 1902, Epitome.

†Fraenkel: Brit. Med. Jour., June 14, 1902, Epitome.

‡Lubarsch: Deut. Aertz. Zeit., October 15, 1901.

§Folli: Rif. Med., August 27, 1901.

Thus we have evidence that many bacilli exist which may be mistaken for tubercle, and we must not be too ready to accept their identity, whatever their source may be.

This investigation has revealed another possible source of error. In about 60 per cent. of the preparations epithelial squames formed a most striking feature; they retained the fuchsin to a remarkable degree, in spite of prolonged treatment by acid and alcohol. It was noticed that the older the squames the more vividly they retained the fuchsin, the younger ones being paler, whilst the most recent of all being unstained with fuchsin, but readily selecting the methylene blue. This property is probably due to the increase of keratin and fatty substances, the result of degenerative age-changes in the cell, and supports Fraenkel's suggestion that the fuchsin selecting and retaining power of some bacilli is due to the degeneration products and fatty acids of putrefaction.

These cells often break up into small, irregular shaped rods and granular clumps, which may be readily mistaken for micro-organisms of the acid-gas group.

They are of still further interest in possessing a diagnostic value, since if the smear be taken from the deepest part of the ear they afford strong presumptive evidence of cholesteotoma, especially, when, as not unfrequently happens, they are more numerous than pus-cells. They are invariably accompanied with a distinctive sour fetor—that of decomposing epidermis, probably due to fatty acids and sulphur, in marked contrast to that of bony necrosis, which has more the character of phosphorus.

Cases of Special Interest.—No. 15 is that of a female with a strong family history of tubercle, four having died from phthisis. In addition to suffering with pulmonary tuberculosis, she is nearly blind with double optic neuritis, which Mr. Treacher Collins attributes to a retrobulbar tubercular lesion. She has suffered with suppurative discharge from both ears for seven years, in which I have found bacilli on each of several examinations. The sputum afforded similar results.

No 50 was one of chronic non-suppurative middle-ear dis-

ease of eight years duration. There being evidence of some accumulation in the right ear, Dr. Dundas Grant performed paracentesis of the membrane, evacuating a few drops of inspissated matter, which contained tubercle bacilli. His sputum afforded abundant evidence of the same bacilli.

Gonococci occurred in three cases, two of which were infants and one was a male aged thirty-nine. The presence of this organism is not without interest, especially during infancy.

In No. 74 tubercle bacilli were found not only in the aural discharge, but also in the pus of the cerebral abscess, operated on by Dr. Dundas Grant. She had a strong family history of phthisis and was much emaciated, but made an excellent recovery.

Conclusions.—This investigation shows that acid- and alcohol-fast bacilli are demonstrable in a large proportion of chronic purulent ear discharge.

That in seventeen cases they were presumably tubercle bacilli, in so far that they conformed to the recognised morphological and staining characters and were for the most part associated with reliable clinical evidence of tuberculosis.

That in seven (pseudo-tubercle bacilli) cases, while conforming in a greater or less degree to the staining requirements, they were morphologically unlike tubercle bacilli, yet five of them had either a family or personal history of phthisis

That success in their demonstration in any great measure depends upon the methods of collecting and staining together with perseverance in search.

That in the peculiar selective action of the squames in retaining the carbol fuchsin—a property specially attributed to certain bacilli—we have at once a possible source of error in diagnosis and an explanation of the peculiar affinity of other bacilli for fuchsin.

Column 1 refers to the nature of the aural disease.

“ 2 gives the duration of the aural symptoms.

“ 3 The sign + that there was either a family history of tubercle or that there was a clinical evidence of such in the patient, independently of the ear.

- “ 6 B. T. refers to acid- and alcohol-fast bacilli, presumably-tubercular.
 P. B. T. represents Pseudo-bac. of tubercle.
 B. P. V. refers to *Bac. proteus vulgaris*.
 N. B.—An exhaustive list of bacteria found is omitted.
- “ 7 records the organized cells present, in order of prevalence.

1	2	3	4	5	6	7	
Disease.	Dura- tion.	History of Phthisis	Age.	Sex.	Bacteria.	Cells.	Remarks.
1 C. S. M. E.	3	0	23	F.	Diplococci, staphylo- cocci	Pus, few squames.	
2 “	1 mo.	0	13	M.	Streptococci.	Pus.	
3 “	3	0	25	M.	staph.	Squames, pus.	
4 “	6	0	13	F.	Staph.	Squames	
5 “	21	0	21	M.	B. P. V., staph.	Squames, pus.	
6 “	2	0	16	M.	B. P. V.	Squames, pus.	
7 “	6	0	24	F.	None found.	Squames.	Cured.
8 “	14	0	17	F.	Dipl.	Squames, pus.	
9 “	31	—	36	F.	Staph.	Squames.	
10 “	3	—	14	F.	B. T.	Pus.	
11 “	4	+	23	F.	B. P. V. P. B. T.	squames. Pus.	
12 “	6	0	20	M.	Staph.	Squames.	
13 “	4	+	34	F.	Staph.	Pus.	
14 “	4	—	17	F.	Staph., P. B. T.	squames. Squames.	
15 “	5	—	24	F.	Staph. B. T. B. P. V.	Pus. squames.	Optic neuritis.
16 “	—	0	—	M.	Staph., B. T.	Squames, pus.	
17 “	15	+	38	F.	Staph.	Squames.	
18 “	—	0	18	F.	P. B. T.	Squames.	
19 “	15	+	18	M.	P. B. T.	Squames.	
20 “	9	0	38	M.	B. T.	Squames.	
21 “	3	+	—	—	P. B. T.	Pus.	
22 “	7	+	15	F.	B. T., dipl.	Pus. squames.	
23 “	4	—	19	F.	Dipl.	Pus.	
24 “	7	0	11	M.	staph., lepto- thrix.	Squames.	
25 “	4	0	17	F.	Dipl., stab.	Pus. squames.	
26 “	18	0	22	M.	Dipl.	Squames.	
27 “	20	0	34	M.	Staph., yeasts.	Squames.	
28 “	5	+	22	F.	B. T.	Pus.	Cerebral
29 “	4	—	19	M.	Strept. bac.	Pus.	[abscess.
30 “	17	+	22	F.	Strept.	Pus.	
31 “	12	0	19	M.	Dipl., B. T.	Pus.	

32	C. S. M. E.	4	+	11	F.	B. P. V.	Pus.	
33	"	2	0	12	M.	P. B. T.	Pus.	
34	"	1	0	8	F.	Mic. tetrag.	Pus.	
35	"	16	+	21	F.	—	Pus.	
36	"	20	+(d)	24	F.	P. B. T.	squames.	
37	"	12	+	17	F.	B. T.	squames.	
38	"	?	0	14	M.	Strept.	squames.	Cerebellar abscess.
39	"	4 mo	0	4	M.	Staph.	Pus.	
40	"	11	+	21	F.	P. B. V.	Pus.	
41	"	40	0	62	F.	Staph. B. T.	squames.	Gran. triturated, Stacked.
42	"	18	+	18	M.	B. P. V.	squames.	
43	"	1	0	14	F.	Staph.	squames.	
44	"	3	+	21	F.	Staph.	Pus.	Supp. glands.
45	C. S. M. R.	6	0	18	F.	Asperg. n.	Squames.	
46	"	17	0	24	F.	Staph.	Pus.	The purulent discharge had ceased 2 years.
47	"	—	+	7	M.	B. subtilis.	squames.	Epithelioma.
48	"	6	0	21	F.	Staph.	Pus.	
49	"	5	+	14	M.	Mic. tetrag.	squames.	Rad. mast. oper.
50	C. C. M. E.	8	+	27	M.	Staph., dipl.	Pus.	
51	C. S. M. E.	12	0	21	F.	B. T.	Caseat.	Paracent. tymp.
52	A. S. M. E.	4 days.	+	10	F.	B. subtilis.	Pus.	
53	C. S. M. E.	6	0	9	M.	Gonoc., strept.	squames.	Mastoid abscess.
54	"	4	0	8	M.	Staph.	Pus.	Supp. glands.
55	"	1	+	3½	M.	Staph.	squames.	
56	"	1	0	15	F.	B. T.	Pus.	Died general tuber.
57	"	16	0	20	F.	Strept.	Pus.	Supp. glands.
58	"	6	+	24	F.	B. T.	squames.	
59	"	6	0	13	F.	Dipl., staph.	squames.	
60	"	2	+	20	M.	Staph.	Pus.	
61	"	9	0	15	F.	B. P. V.	squames.	
62	"	10	0	21	F.	Staph.	Pus.	
63	"	4	0	19	M.	Dipl.	Squames.	
64	"	20	+	33	M.	B. coli c.	Pus.	After two years' treatment.
65	"	12	0	37	M.	B. P. V.	Squames.	
66	"	10	+	13	M.	Strep. B. T.	Pus.	Right hemi-plegia, optic neuritis (double).
67	C. S. M. E.	6	+	16	F.	B. T. (twice).	Squames.	
68	"	26	+	31	F.	No B. T.	Pus.	
69	"	2 mo.	0	4	M.	B. T.	squames.	
70	"	14	+	40	F.	P. B. T. (?)	Pus.	
71	"	—	0	4	M.	B. T.	squames.	Extremely fetid.
72	"	7	+	33	M.	P. B. T.	Pus.	Pulmon. gangrene.
73	"	5	+	6	M.	B. P. V.	squames.	Supp. glands.
74	"	10	+	21	F.	Staph.	Pus.	
75	"	4	0	39	M.	B. T.	Squames.	Cerebral abscess.
						Gonoc.	Pus.	Adenoids and supp. glands.

76	A. S. M. E.	5 d'ys	+	1	M.	Gonoc.	Pus.	
77	C. S. M. E.	6 mo.	0	5	M.	Dipl.	Pus.	
78	"	15	0	35	M.	No B. T.	Squames.	Very fetid, Stacke; cholesteatom.
79	A. S. M. E.	3 wks	0	6	F.	Dipl bac., staph.	Pus.	
80	C. S. M. E.	25	0	27	F.	B. P. V.	Squames, pus.	Rad. mast. op.
81	"	11	+	37	M.	Staph.	Squames, pus.	
82	"	8	0	18	M.	Staph.	Squames, pus.	
83	"	13	+	14	M.	B. T.	Pus, squames.	
84	"	20	0	22	F.	B. P. V.	Pus, squamss.	
85	"	6	0	12	M.	Staph.	Pus.	
86	"	5	0	9	M.	B. P. V.	Pus.	
87	"	1½	0	11	F.	No B. T.	Pus, squames.	Enlarged glands.
88	"	21	0	12	F.	Staph.	Squames.	
89	"	17	0	18	M.	Dipl., staph.	Squames, pus.	
90	"	3½	0	5	M.	Dipl., staph.	Pus.	Stacke: acute mast. abscess.
91	"	5	0	22	F.	Staph.	Pus.	
92	"	30	+	35	F.	Mic. tetrag.	Squames.	Very fetid.
93	"	18	0	20	F.	No B. T.	Pus, squames.	
94	"	5	0	10	M.	Staph.	Pus.	Supp. glands.
95	"	6	+	11	M.	B. P. V.	Pus.	
96	"	4 mo.	0	12	M.	Dipl., staph.	Pus.	Facial paraly- sis.
97	"	15	0	35	M.	No B. T.	Pus.	Very fetid.
98	"	20	0	27	M.	Staph., dipl.	Squames.	
99	"	6	0	7	F.	Staph.	Pus.	
00	"	2	+	27	M.	Mic. tetrag.	Pus.	

XL.

A CASE OF THROMBOSIS OF THE CAVERNOUS SINUSES.*

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SURGEON TO THE EYE, EAR, THROAT, AND NOSE DEPARTMENT OF
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The patient, a married woman, aged forty-one years, was seen in consultation with Dr. Thomson of Shelf on December 13, 1902. Dr. Thompson gave me the following history:

"He saw the patient on November 9, 1902. She complained of neuralgia, most acute, confined to the left supra-orbital, temporal and malar regions. She also had a dull pain at the back of the left eye. There was nothing to be seen at this time externally, but there was a distinct fulness between the left alveolar margin and the cheek. The teeth were very bad; no tenderness over the swelling which was, however, incised freely, but no pus found. Temperature, normal. The family history was good and there was no history of syphilis. The excruciating pain continued for the next ten days, when at the end of this period she described it as throbbing in character. Temperature 99.5°.

"On November 28, 1902, a swelling was noticed extending almost from the base of the left tonsil to the second or third molar. This was incised, and a quantity of thick creamy pus evacuated. Patient obtained relief from pain for twenty-four hours, and enjoyed a little natural sleep for the first time since the onset of symptoms. A week later a further incision was made as there seemed to be a collection of pus below the former opening; small amount of pus escaped. On the following morning there was some edema of the left lower eyelid: the pain had practically disappeared. The edema

*Communicated to the British Laryngological, Rhinological, and Otolological Association, March 13, 1903.

rapidly spread in the next forty-eight hours to the upper lid and conjunctiva, also to the right eye, which became affected in a similar manner—namely edema of both lids and chemosis. The edema extended to the root of the nose and on to the forehead. There was edema about the angle of the jaw on the left side. Patient complained of pain in the left ear, accompanied by a little discharge.

"On December 12 a tooth was drawn, and the antrum of Highmore explored, without finding any pus. Temperature, 100-5°".

On December 13 I saw her with Dr. Thomson. We diagnosed thrombosis of the left pterygoid plexus extending to cavernous sinuses, which at first was probably idiopathic in nature, causing a passive edema, which afterward had become infected from the mouth, or that a septic throat or mouth had caused the thrombosis.

The patient was admitted into the Royal Halifax Infirmary on December 13, 1902. On admission both eyeballs were markedly proptosed. The upper and lower lids of both eyes were red, edematous, and there were ptosis. The ocular palpebral conjunctiva was chemosed, and protruded between the closed lids, but the chemosis did not cover the corneae. There was a slight muco-purulent discharge; the corneae were clear. The ocular movements were limited in every direction. Sight was not impaired to any very marked degree. Pupillary reactions were sluggish; slight myosis. Beyond fulness of veins, there were no gross fundal changes. There was a circular patch of edema at the root of the nose, which extended on to the forehead, about the size of of a crown piece. The skin there was slightly red, but not tender. There was also a brawny edema extending forward and upward from the angle of the jaw on to the left side over the pterygoid and the malar regions. A little tenderness existed over this area. The mouth was in a very dirty condition, the teeth very bad, and pus could be seen oozing from the socket of the last molar. The left tonsil was swollen and congested. The swelling extended from the base of the tonsil forward along the soft palate as far as the second molar; the swelling was confined to the left side of the middle line. There was a small incision at the root of the left tonsil, from which pus.

was exuding. Anterior rhinoscopy disclosed no gross changes in the nose or presence of muco-pus. The left ear was filled with epithelial débris and pus. After cleansing meatus no perforation could be seen. Patient was quite sensible, and could give a fair account of her illness, and could swallow fairly well. Temperature, 102.



During the first three or four day the patient remained in the same condition; fair discharge of pus from the incision at the base of the tonsil. The discharge from the had ceased, and the patient had not had earache. Temperature remained high, varying between 100° and 103°.

December 19, 1902. Free discharge of pus from the left nostril when patient blew her nose or when it was syringed.

Four doses of 10 cc. of antistreptococcic serum had been injected since admission without any reaction. The throat was cleaner, and there was no discharge from the ear. The edema of the lids, conjunctiva, and the proptosis was worse. There was complete paralysis of the ocular muscles on both sides; there was also more fulness about the angle of the jaw and molar regions, and the swelling at the root of the nose had increased.

As the patient was growing worse, it was decided to explore under chloroform and give a free exit to pus. An incision was made in the soft palate, or rather, the original incision was extended. A fair amount of pus was let out. Another was made just behind the angle of the jaw, and a quantity of pus at once escaped. A drainage-tube was passed through the soft palate round behind the ramus of the jaw and out through the wound at the angle. The horizontal ramus of the jaw was found to be stripped of periosteum. The ends of the tube were fastened at the angle of the mouth. The swelling on the forehead was also found to contain pus, which was drained.

Although there was a great deal of pus in the nose, one could not trace its origin. The orbits were not explored at this time. The operation had no effect on the temperature on the pulse-rate; patient, however, took her food a little better.

December 24, 1902: There seemed to be more swelling of the lids; the orbits were explored, and pus came from both, more especially the right one. Patient very drowsy, and there was a little pneumonic consolidation at both bases. Temperature, 101°; pulse, 152; respiration 40.

January 1, 1903: Patient very much worse the last two days; had had convulsions, only conscious at intervals, pus discharging freely from the left nostril and right orbit.

Patient died January 2, 1903.

A post-mortem examination was made twelve hours after death. Dura mater discolored. Superior longitudinal sinus was filled with ante-mortem clot adherent to wall. Dura mater opened, allowing escape of fetid pus. Diffuse purulent lepto-meningitis. Brain was adherent to the dura over the right frontal lobe. Both hemispheres are bathed

in pus, showing advanced encephalitis with necrosis, especially on the left side of the frontal lobes.

The necrotic changes extended along the left Sylvian fissure. In the mid-line the portion of the brain adjacent to the middle-third of the superior longitudinal sinus was similarly affected. The frontal region had the appearance of pus having been poured over a putty model of the brain, which had been indented deeply with the finger-tips. The cortical veins were greatly engorged; the ventricles were empty.

There was a large collection of pus over each orbital plate, extending backward along the base to the anterior margin of the foramen magnum. Not much pus in the middle fossa, posterior fossa free. Left cavernous sinus filled with septic thrombus and pus.

An erosion of the wall of the sinus extended into the cavum sellae of the sphenoid. The septic thrombosis extended forward into the superior and inferior ophthalmic veins. The intercavernous sinuses and the right cavernous sinus and ophthalmic veins were involved. There was a subdural abscess between the basilar plexus and the cantle of the saddle. The bone here was broken down, and a blunt instrument easily passed into the cavum sellae. Permission not having been obtained for a complete autopsy, it was considered inadvisable to attempt to trace the thrombotic process on the left side into the pterygoid plexus and along other venous ramifications. The carotid canals on both sides contained pus. The superior and inferior petrosal and inferior longitudinal sinuses were patent. The lateral sinus contained a septic ante mortem thrombus clot, extending to the torcular Herophili on either side.

The cavity of the sphenoid was exposed from above; it was full of pus. The communication was quite free.

The opening in the left lateral wall, referred to above, had smooth margins, and was about 6 millimeters in diameter. Examination of the opening between the left cavernous sinus and cavum sellae gave no clue as to whether the sepsis had spread from the venous sinus or osseous sinus. If from the venous sinus, then the thrombotic process had extended from the pterygoid region; if from the bony sinus, then the sphenoidal empyema was the original focus, unless the condition had originally been idiopathic.

The drainage into the nose from the sphenoidal cavity was very free.

The ethmoidal and frontal cells were normal. The antra of Highmore were roomy and free from pus. The left contained turbid serum.

The left tympanic cavity was examined through the tegmen tympani, and found to be free from pus. *Perspeculum*, the external auditory meatus and the membrana tympani were normal in appearance.

REMARKS.

Macewen* states that a case of primary marasmic thrombosis of the cavernous sinus has never been recorded. In this case the age of the patient and previous history were also against such a supposition. I have recorded elsewhere† a case of idiopathic thrombosis of the lateral sinus, in which the middle ear was absolutely healthy and in which the thrombus, with the consequent passive edema, remained aseptic, death occurring from a non-infective encephalitis. The patient's previous history, and the examination of the nose, orbits, and ears, led us to conclude that the primary mischief was in the pterygoid plexus. If ever again a similar case be encountered, an attempt to surgically treat the cavum sellae, after preliminary removal of the middle turbinal, would be made.

My best thanks are due to Dr. Thomson, the patient's medical attendant, to Dr. C. H. Turner, Senior House-Surgeon, for much valuable assistance in the conduct of the case, and to Mr. Wrathall, the electrician, for the photographs.

*Macewen: "Pyogenic Disease of the Brain and Special Cord," p. 245.

†The Journal of Laryngology, September, 1900.

XLI.

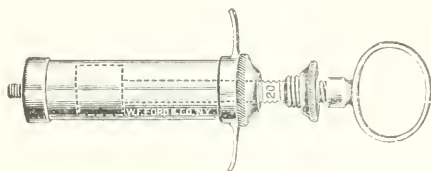
PARAFFIN SUBCUTANEOUSLY INJECTED FOR THE CORRECTION OF EXTERNAL DEFORMITIES. — THE DANGERS TO BE AVOIDED AND THE TECHNIQUE.

BY HARMON SMITH, M. D.

NEW YORK.

ASST. SURG. MANHATTAN EYE AND EAR HOSPITAL.

Owing to the ease with which paraffin may be injected under the skin; it is carried far beyond the necessities of the case and when the needle is withdrawn, the patient has a Grecian nose upon a German face. Nor is this the only untoward condition likely to arise, as excess of pressure is exerted



on the tissues which diminishes the blood supply to that part and is likely to be followed by slough. To obviate such a calamity, it is advised to inject only a portion of what you intend to add finally, and discontinue injecting after observing an anemia of the skin over the deformity. It is far easier to add more paraffin than to remove it after it is once under the tissues.

The next of the evils to be considered is the entrance of paraffin into adjacent tissues not intended for injection. Par-

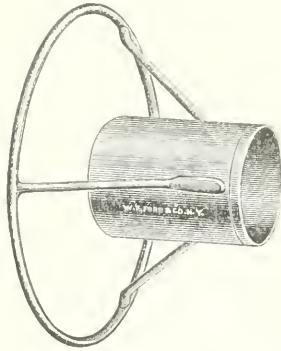
ticularly is this the case in regard to the soft tissues of the orbit, upper and lower eyelids, and over the forehead. I have had several cases referred to me where the paraffin had encircled the orbit, filling in both upper and lower lids. Here it is particularly noticeable, and produces an extremely red and swollen appearance, which is much more objectionable than the original deformity. It can be readily conceived how this may occur in the use of ordinary piston syringes when the paraffin is used hot; but where a screw piston is used and the paraffin is in a solid form, it is beyond my comprehension how anyone can get such a deformity.

It has never been my misfortune to go astray since using the screw-piston syringe. With the administering fingers of an intelligent assistant, one can be accurately informed of the pressure brought against the tissues, and can stop injecting when the assistant admonishes that too much force is being expended against his fingers. There is no mechanical arrangement that can embody the sensibilities of the tactile nerves, and give warning of the danger point.

The third precaution is against surgical uncleanness. Improperly prepared instruments, field of operation, paraffin or hands of operator is sure to result in abscess, with a possible slough. An oft cited case, which has done great damage to the pursuit of paraffin work, was probably the result of some fault in technique. Although my paraffin is sterilized by a chemist and sealed in tubes ready for use, I invariably boil the same in a sterilizer before using.

The fourth evil, if due to paraffin, is one of serious consideration. There have been two reported cases of embolus of the arteria centralis of the retina. In the last reported case of Hurd's, there was too close a connection between the time of injection and the resultant blindness in one eye for anyone to say abstractly that paraffin was not the cause of the embolus. However, there have been hundreds of injections of paraffin reported, and only two sequelae of this nature, and there is a possibility of this being a coincidence for which paraffin is in no way responsible. The embolus might have been occasioned by an increased arterial pressure brought against some easily detached particle clinging to the intima

of the vessel, and thus found its way to the eye at this time. Yet few medical men are willing to accept these possibilities. Though Hurd used a screw-piston syringe, he used a paraffin largely mixed with white vaseline, and this invariably softens the paraffin and makes it granular. I believe in using a paraffin as nearly pure as is possible to obtain and with a melting point of 110° F. If it is obtainable at a melting point of 110° F. without any other mixture, so much the better. Another element of chance enters into the case, and that is the consistency of paraffin. Sometimes an operator is unwilling to wait for the paraffin to harden before injecting, and injects it



when it is semi liquid. In the light of our present experience this should never be done; but one should await the hardening of the substance throughout the cylinder, and then it will be ejected from the needle in a rod like form apparently safe from embolus and yet sufficiently mouldable. Too much time and patience can not be expended in this way, particularly if we wish to feel absolutely safe in making our injections. The injection should be made away from the angular vein, and not toward it. I now make all my injections with the needle pointing toward the tip of the nose, and never upward toward its root. It is sometimes necessary to use a curved needle in order to accomplish this.

The fifth evil is one of neglect in looking carefully

into the general health of the patient. I would never inject into a diabetic or nephritic patient. Slough is imminent in either. Gouty and syphilitic patients are not the most desirable subjects. In the first we have more or less pain around the injection for some time after, and in the latter considerable edema results, lasting for a week or more. I have never seen other unfavorable symptoms than these, in this class of patients. The redness which sometimes ensues is controlled by ichthyol (20 per cent. solution) applied on cloths during the night. It has been suggested by Cobb of Boston that antiphlogistine and peroxid of hydrogen have similar pleasing results. I have never seen the redness long persistent, even in very delicate women with thin skin. I am unable to state what result would obtain in alcoholics.

TECHNIQUE:—Ordinary surgical technique is all that is to be observed. My routine invariably is as follows:

- (1) Scrub field of operation with green soap and water.
- (2) Apply alcohol freely.
- (3) Wipe off with a bichloride solution of 1 to 5000.
- (4) Pour on a little ether.

The syringe and needle are boiled and then allowed to cool sufficiently for easy manipulation, and the hands are surgically cleansed. At the point of entrance of the needle I usually inject three or four minims of a 4 per cent. solution of cocain. Some operators prefer a weaker solution. I have in several instances, injected the paraffin without any anesthetic, and with but slight pain to the patient, and that only upon entrance of the needle. Into a closed tin receptacle I pour the paraffin, after melting, from the test tube, and place this receptacle into a sterilizer or any ordinary boiler; surround it almost entirely with water and boil. After I have boiled it for a few minutes, I remove the paraffin, draw it up into the syringe, which has been sterilized in the same boiler with the paraffin, and when sufficient is withdrawn, I evacuate the air bubbles from the syringe by pressing the piston upward, and run the set screw into place. Sufficient time is now allowed for the paraffin to assume equal consistency throughout and to cool down to a semi-solid state. This may be expedited by placing the syringe in a bowl of sterilized water at 80° F. Before beginning my injection, I warm

the needle of the syringe in some hot sterilized or even boiling water to soften the paraffin which has formed a hard plug in it, because the screw force exerted thereon may either cause the paraffin to run back of the metal piston, or, as happened in one instance brought to my notice, burst the needle. Should the paraffin come out in little interrupted spurts when the piston rod is revolved, and if of a too liquid nature, I again cool, warm the needle as before and continue until the paraffin is ejected in a proper state. When this condition is reached, I insert the needle beneath the skin, but above the periosteum, carrying its point slightly beyond the deformity and begin to inject; having the assistant exercise pressure upon the soft tissues at inner canthi and upon the region of soft tissue at the junction of nose and forehead. Supporting the syringe with one hand, I mould and smooth the injected paraffin to the requirements of the case, only injecting small quantities at a time, and exercising the greatest care to prevent injecting too much. In most cases I overcome the deformity at the first injection but it is by no means advocated as a rule. Some of the best results have followed three injections. After the first few minims have been injected, I gradually withdraw the needle, making slight additions to the original quantity, and taking every care to mould and smooth the surface, so as to leave the overlying tissues perfectly even. After withdrawing the needle, I spray the part with ether, which almost immediately hardens the paraffin and insures a better result. The entrance of the needle is sealed with collodion and the patient instructed to apply the ice cloths for twelve to twenty-four hours. When the second injection is necessary, I have the patient return in one week; but where circumstances made earlier attention desirable, I have not hesitated to make it in three days after the first.

XLII.

TOBACCO NERVE DEAFNESS.*

BY WYATT WINGRAVE, M. D.

GENTLEMEN:—Let me first express to you my deep appreciation of the honor which you have conferred upon me. No one can feel the honor and its responsibilities more keenly than I do, and were it not for the confidence in your readiness to make concessions for my deficiencies and to afford me help in difficulties, I should certainly not be able to accept an office so ably and worthily held by my distinguished predecessors.

My next duty is to heartily congratulate our past President upon the unqualified success of the Association during his second year of office, for which his tact, courtesy and kindness are in no small measure responsible. Dr. McIntyre in the regularity of his attendance, in his own natural enthusiasm, and his lavish supply of scientific material, has rendered my position as his successor a most difficult one to occupy.

This being the first society formed in Great Britain for the study of our specialties, I do not think that a critical survey of our collected transactions would afford any disappointment to its founders, and I sincerely trust that its standard of usefulness will not suffer in my year of office. We have now two sister societies whose objects run parallel with our own; their success we most cordially appreciate. They have not supplanted the older relation, but their success has only served to emphasize the wisdom of our founders. With regard to our work, there is one point which I cannot overlook—viz.: The great obligation which we in London are under to our Fellows who so conscientiously attend the meetings. We well know their difficulties in presenting cases, consequently we must recognize that it is our

*Presidential Address to the British Laryngological, Rhinological, and Otological Association, January 30, 1903.

duty to relieve them in that respect, knowing that we may confidently rely upon them to furnish us with other material for discussion.

Further, while maintaining a good supply of clinical material, I trust that Morbid Anatomy and Pathology will continue to occupy a prominent position at our meetings, since every facility is afforded by the Council for microscopic and other exhibits.

It has been suggested that three societies are unnecessary, and that they are in the position of having outlived their usefulness. Neither of these views can be endorsed with reference to the British Laryngological, Rhinological and Otolological Association. In the first instance, it is not purely Metropolitan, but as its title shows it is essentially British, and it does not confine its work to one particular branch of specialism; moreover, the solid evidence of its vitality is, I think, sufficient answer to the second suggestion. But there is one point which we must not lose sight of—viz.: that our meetings are not entirely devoted to the exhibition of clinical cases, but include also the reading of papers and their subsequent discussion. This traditional division of our meetings into two portions is an important and distinctive feature of our Society, and will, I trust, continue to meet with your approval.

I must now claim your indulgence for deviating slightly from the orthodox address in substituting a preliminary introduction to a clinical subject, which, I venture to think is one not without interest and importance.

We cannot fail to have observed the rapidly increasing consumption of a drug which is not only beyond all proportion to the increase of population, but promises to extend to a still greater degree; and, further, that its over indulgence (especially by youths) is likely to be responsible for serious morbid changes, some of which are of immediate interest to us in one department of our work. I refer to tobacco. Its responsibility for certain morbid visual changes has been fully established, and, observing the frequent recurrence of deafness in these suffering with tobacco amblyopia, it occurred to me that the Association might be more than coincidental. This prompted a careful examination of such cases,

with results which justify my submitting to you a preliminary communication on the subject.

The relationship between rhinology, otology and ophthalmology has recently been before us in the shape of Dr. C. Ziem's paper* on "Diseases of the Eyes and Nose," and cases were shown by Mr. Mayo Collier and myself illustrating the occurrence of optic neuritis with middle ear disease, so that the field is not a new one to us but embraces another aspect.

Most of the cases now referred to occurred in my hospital practice, some were seen in private, and others were referred to me by my colleagues. With regard to the ocular phenomena, the scotoma cases were verified by specialists in that department.

It will suffice to briefly sketch the main features which were observed. Deafness due to tobacco smoking may be conveniently classified in three groups, according to their etiology: (1) Mechanical or pneumatic. (2.) Irritative or catarrhal. (3) Toxic or nerve deafness.

1. *Mechanical*.—This has its origin in the habit of smoking a tightly-packed pipe, cigar, or cigarette, especially in those suffering with nasal obstruction. A violent minus or negative naso-pharyngeal pressure is exerted with each inspiration, not only upon the Eustachian tubes, but also upon the blood and lymph vessels of the parts, so leading to persistent hyperemia, upon the symptoms and treatment of which we need not dwell,

Irritative or Catarrhal.—This form is very familiar in early morning cough and expectoration of habitual smokers. It is caused by the chemical and mechanical irritation of the smoke on the mucous membrane, extending along the Eustachian tube and inducing hypertrophic changes in that canal and its connections.

Toxic or Nerve Deafness.—This is due to the gradual accumulation of certain toxins of tobacco in the system. Whatever the actual poison may be, whether picrotoxin, nicotine, or any other, it is, as a rule, found in largest amount in the darkest, strongest, and cheapest tobaccos, *e. g.*, cut plug,

cut cavendish, shag, etc., also in cigars of the Maduro strength, Oriental as well as Occidental. This poison is undoubtedly cumulative, since complete abstinence is essential in effecting any permanent improvement; mere reduction in the quantity consumed or of its strength generally proves unsatisfactory.

The effect of tobacco toxin upon the cardio-vascular system is familiar to all of us, also its influence upon the gastrointestinal tract, which may be responsible for the production of further toxins.

But its most striking effect is upon the nervous system, as exemplified in "Tobacco Amblyopia" a disease characterized by degeneration of certain bundles of the optic nerve, known as the papillo-macular fibres, constituting scotoma, a condition associated with the loss of appreciation of the visual red waves.

Does the auditory nerve present a similar degeneration? Although at present we have no definite histological evidence, the fact that there was a marked deficiency in the appreciation of low tones in 50 per cent. of the cases recorded is presumptive evidence in favor of there being some selective degeneration at work in the auditory as in the optic nerve.

The effect of the toxins may perhaps be terminal and central, but these are questions which demand careful and extensive observations, both histological and clinical.

The cases which I have examined are seventeen in number. They were those of typical nerve deafness, for which no cause other than tobacco abuse could be found. To save time I give you a brief abstract of their features.

Agcs.—With regard to age, eight occurred between twenty-four and forty, nine between forty-eight and sixty-four.

Tobacco.—They all smoked very strong tobacco or cigars, and in large quantities.

Deafness.—They were all subjects of nerve deafness; the appreciation of low tones was defective in eight, tinnitus and vertigo being generally well marked.

Vision.—There was marked impairment of color sense—red—in twelve; of these four had well-defined scotoma.

Treatment.—Treatment consisted in complete abstinence

from tobacco in every form, with the administration of strychnia, quinin or bromides.

Results.—Quinin and bromides, separately or combined, afforded no appreciable effect, but strychnia pushed to full doses, proved more successful. Three severe cases were completely cured in eight, nine, and twelve months, respectively; nine showed marked improvement, two improved only slightly, and two refused to continue treatment.

That the improvement was in a great measure due to arrest of smoking was shown in several cases, which always relapsed on resuming the habit, although the strychnia was continued in. Improvement was again marked on abstaining from tobacco.

In conclusion, allow me to emphasize the following points:

1. That they were all well-marked cases of nerve deafness (unattributable to other causes) occurring in heavy smokers.

2. That the loss of low tones in 50 per cent. suggests an auditory equivalent for a recognized ocular lesion.

3. That the disease was symmetrical.

4. That there was impairment of color sense in eight of them, and definite scotoma in four cases.

5. That 80 per cent. showed marked improvement on abstinence from tobacco, supplemented by drug treatment; three were cured. But the habit was so strong and the will so weak in the rest that the forecast and the results were not encouraging.

The confirmed smoker is often as tenacious of his habit as the tea-drinker and victims of alcohol, opium, cocain, and other habits.

Although you will doubtless find in these notes many points of weakness and many deficiencies, still I trust I may have presented sufficient evidence to justify my selection of the subject, in view of a more thorough clinical analysis in the near future, and also of eliciting the views of those whose wider experience of scotoma may enable them to speak with greater confidence.

ANALYSIS OF SEVENTEEN CASES OF TOBACCO NERVE DEAFNESS.

1. C. S——, a warehouseman, aged twenty-four, com-

plained of deafness and noises of nine months' duration (right ear). He smoked two ounces of shag weekly. Rinne +. Air C.—12. Bone C.—5. Diminution of low tones. Difficulty in appreciating red. Treatment: Quinin. Result: Marked improvement in four months.

2. Thomas M——, aged fifty, horsekeeper. Deafness both ears, with tinnitus; nine years' duration. Smoked 1 ounce of shag daily. Air C. R.—40; L.—30. B. C.—30; L.—20. Rinne+. Loss of low tones. Color sense: Green appeared blue; red caused much uncertainty. Treatment: Bromides. He would not entirely give up tobacco, but smoked less and of a milder kind. Result: Slight improvement.

3. J. B——, aged thirty-six, a clerk. Complained of deafness and noises; six months' duration. Smoked three ounces of dark Virginia weekly. Meatus and mastoid were both—. Rinne+. Low tones lost. Color sense: Reds dull. Treatment: Strychnia. Result: Improvement in two months.

4. E. P——, aged fifty-four, carpenter. Deafness in left ear: ten years' duration. Had been a very "heavy smoker", but lately had reduced his allowance to $\frac{3}{4}$ ounce of shag daily. Meatus—. Mastoid—, Rinne+. Low tones deficient. He was under treatment for scotoma, which, with deafness, improved on giving up tobacco.

5. C. H——, aged fifty-four, laborer. Deafness right ear with noises and giddiness; six months' duration. Smoked $\frac{1}{2}$ ounce black cavendish daily. Both meatus—. Both mastoids—. Both Rinne—. Low tones lost. Vision nictalopic: Slight bilateral scotoma; reds appeared brown. Treatment: Quinin and strychnia. Result: No improvement; refused to give up or diminish his tobacco.

6. A. R——, age 40, ostler. Deafness both ears; six years of and off. He volunteered statement that he was always better when he reduced the tobacco. Tobacco reduced during last four months to one-half ounce of shag daily. Meatus, R.—6; L.—4. Mastoid, R.—; L—. Rinne, R.+; L+;. Color sense: for reds almost gone. Well defined scotoma. Was under Mr. Lang at Middlesex Hospital. Treatment: Strychnia. Great improvement.

7. F. K——, aged thirty-four, blacksmith. Deafness in both ears; four years' duration. Smoked $\frac{3}{4}$ pound navy

cut weekly. Meatus, R.—12; L.—15; Mastoid, R—6; L.—5. Rinne, R.+; L.+. Color vision: Red appeared as chocolate. Faint scotoma. Treatment: Strychnia. Patient disappeared.

8. J. T—, aged sixty, painter. Deafness; ten years on and off. Smoked half ounce shag daily. Meatus, R.—8; L.—12. Mastoid, R.—4; L.—5. Rinne, R.—, L.+. Color vision: Reds were "dirty," Under treatment at Moorfields for scotoma. Treatment: Strychnia; no tobacco. Result: In four months reported as better.

9. W. M—, aged sixty-four, farmer. Deafness and noises; for four years always smoked 1 ounce shag daily. Meatus, R.—4; L.—7; Mastoid, R.—6; L.—8; Rinne, R. +; L.+. Color sense not recorded. Diminution of low tones. Bromides, no effect. Strychnia afforded slight relief, but great improvement followed complete arrest of tobacco in seven months from commencement of treatment.

10. E. G—, aged fifty-six, park keeper. Deafness four years. Smoked an ounce and a half dark Virginia daily for many years. Meatus, R.—6; L.—2; Mastoid, R.—7; L.—2. Rinne, R.+; L.+. Color sense normal. Low tones weak. Treatment: Strychnia; no tobacco. Result: Cured in twelve months.

11. H. S—, aged thirty-four, clerk. Deafness and noises; twenty years. Smoked $\frac{1}{4}$ pound weekly. Meatus, R.—4; L.—10; Mastoid, R.+6; L.—4. Rinne, R.+; L.+. Color sense good. Treatment: Tonsillotomy, bromides. No change in two months. Stopped tobacco and put on strychnia. Marked improvement in two months.

12. J. S—, aged twenty-two, clerk. Deafness and noises in both ears. Duration, 18 months. Slight smoker. Meatus, R.—2; L.—8; Mastoid. R.+4; L.—17. Rinne, R.+; L.+. Color vision: "Dirty" red. Treatment: Strychnia; no tobacco; Result: Improved in one month and cured in eight months.

13. T.M—, fifty-three, farmer. Deafness, noises and giddiness. Duration, two years, on and off. Moderate smoker since youth. Meatus, R.—8; L.—20; Mastoid, R.—10; L.—10. Rinne, R.+; L.+. Color sense: Hesitates over reds. Treatment: Strychnia and no tobacco. In three

months all symptoms greatly reduced, except tinnitus. Six months later quite cured.

14. M—, aged thirty, Royal Navy. (Dr. N.) Gradually increasing deafness. Duration, three years. Smoked 3 ounces of black navy cut per week; always a great smoker. Meatus, R.—4; L.—9; Mastoid, R. normal; L. normal. Rinne, R+; L+. Color sense: Reds were magenta. Treatment: Iron, quinine and strychnia, and no tobacco. Result: Marked improvement in four months.

15. M—, aged forty-eight, waiter. Deafness and noises; ten years. Smoked six cigars daily for many years. Meatus, R.—6; L.—6; Mastoid, R. normal; L. normal. Rinne, R+; L+. Low tones defective. Color sense: Difficulty with reds. Myopic. Quinin hydobrom, and no tobacco. Result: Marked improvement in three months.

16. M—, aged forty-nine, fitter. (D. G.) Deafness and noises on and off twelve months. Smokes freely. Meatus, R.—8; L.—6; Mastoid, R.—4; L.—5. Rinne, R+; L+. Color sense: Uncertain. Treatment: Strychnia, no tobacco, and Eustachian catheter for ac. C. M. E. Result: Marked improvement.

17. J. J—, aged forty, barman. Deafness four years. Smoked 3 ounces of navy cut daily. Meatus, R.—10; L.—8; Mastoid, R.—4; L.—6. Rinne, R.+; L+. Color vision: Uncertain. Treatment: Strychnia and less tobacco. Result: Patient disappeared.

XLIII.

A CASE OF ACUTE OTITIS MEDIA AND SINUS THROMBOSIS; MASTOIDECTOMY; EXCISION OF INTERNAL JUGULAR VEIN; SEROUS MENINGITIS; EXPLORATOR CRANIOTOMY; DEATH; AUTOPSY.

BY EDWARD BRADFORD DENCH, M. D.,

NEW YORK.

C. A., age eight years, case under my observation at the New York Eye and Ear Infirmary, suffering from an acute inflammation of the right middle ear. When I first saw the patient, the disease was of about three days' duration. The boy had been suffering from intense pain in the ear. On examination, I found bulging of the drum membrane, most marked in the posterior portion, and there was some tenderness over the mastoid process, especially at the tip. The upper wall of the canal, close to the drum membrane, was slightly sunken, but not markedly so. The patient walked with his head slightly inclined to the right side, as if the neck was stiff. A free incision was made through the posterior segment of the drum membrane, and the ear was ordered to be irrigated every two hours with a 1-5,000 solution of bichloride of mercury. Two days later the patient reported again. The neck was still stiff, but the incision had given complete relief to the patient for about twenty-four hours. The night before his second visit, however, he had not slept well. The mastoid tenderness was somewhat less than at his previous visit. The ear was discharging very profusely, and the opening through the drum membrane seemed sufficient to ensure free drainage. The child was, therefore, sent home, with orders to continue the irrigation as before. Three days after I again saw him. At this time the discharge from the

ear was scanty, the pain had been continuous and severe since the last visit, the neck was more stiff, and there was decided tumefaction below and behind the tip of the mastoid process. The patient was admitted to the hospital, and immediately placed upon the operating table. The mastoid was opened in the typical manner, the antrum being first opened; neither pus nor granulation tissue was found, and the antrum seemed in an absolutely normal condition. On exploring the mastoid tip, considerable pus was found in the tip cells. On opening these cells, the pus within them pulsated, and further exploration showed that this pus was in immediate contact with the outer wall of the sigmoid portion of the lateral sinus. The tip cells were removed and the sinus exposed for the length of about three-quarters of an inch. On incision of the sinus a firm clot was found to occupy its lumen. The curette used in the upward direction removed the clot and free hemorrhage followed. The curette introduced into the sinus, in the direction of the jugular bulb, removed fragments of the thrombus, but no hemorrhage followed the curette. I, therefore, immediately proceeded to excise the internal jugular vein. The vein was removed from a point just below the omohyoid muscle to a point just below the base of the skull. The deep cervical lymphatics were considerably enlarged, and their excision rendered the operation a tedious one. The vein contained fluid blood, but was very narrow at its upper portion, undoubtedly due to the infiltration of the wall of the vein. The incision in the neck was closed by interrupted sutures, the ordinary dressing applied, and the patient put to bed. He did very well, and the dressings were changed upon the third day. The central portion of the wound in the neck had united, but it had broken down both at the upper and lower end of the incision, and there was found to be considerable pus beneath the superficial tissues. Up to that time, the patient's temperature had ranged between 99° and 103° and the pulse between 50 and 120. The child had seemed perfectly bright, had answered questions intelligently, and had complained of no pain. The dressing was changed again on the next day and the child appeared to be doing well. On the following morning, the child appeared to be stupid, and the temperature was slightly elevated; the pulse, how-

ever, became steadily slower; in the morning it was 62, at noon it was 72, and when I examined him in the afternoon it was only 42. At the time of my examination, the patient was somewhat dull, but responded readily to questions. He named objects shown him, and recognized members of his family and the attendants, although his answers were slow and he seemed somewhat dull. An examination of the eyes at this time revealed a beginning optic neuritis upon both sides, slightly more marked in the right eye. The field of vision was normal in both eyes and there was no impairment of motion of either eyeball. I might say here that the eyes had been examined immediately after the primary operation, and the discs had been found to be perfectly normal in both eyes. Another symptom which the patient presented was a condition of catalepsy. This cataleptic state involved both the upper and lower extremities; both arms and both legs being raised in any position, they were held in this position by the patient for a considerable period of time; in fact, they remained in the position placed indefinitely. Owing to the slow pulse, and the optic neuritis and the cataleptic condition, I felt convinced that there was some increased intracranial pressure. From the involvement of the parts found at the primary operation, it seemed possible that there might be an abscess of the cerebellum, although, from the short duration of the inflammation, this seemed rather improbable. It was rendered more improbable from the fact that there had been no nausea or vomiting, no disturbance of equilibrium, as far as we could determine, and no nystagmus.

The patient was placed upon the operating table and an incision was made at right angles from the centre of the original mastoid incision, backward, for about two inches. The cerebellar dura was rapidly exposed behind and below the lateral sinus. The dura in this region was deeply injected and congested. A dural flap was then turned down and the cerebellum immediately bulged into the wound. The knife was passed deeply into the cerebellum in several directions, but no pus was evacuated, although the brain tissue seemed exceedingly soft, and what might be termed "liquefied brain tissue" exuded from the margins of the incision. The deeper incision of the knife was followed by the gush of clear serum,

and I at once appreciated the fact that the incision had entered the fourth ventricle. This serous fluid confirmed the diagnosis of serous meningitis. A light packing was introduced between the margins of the incision of the cerebellum, care being taken not to carry this strip of gauze deeply. The exposed cerebellar area was covered with sterile gauze, the posterior angle of the wound sutured, the ordinary dressing applied, and the patient returned to bed. It is hardly necessary to say that throughout the operation great care was taken to prevent infection of the operative field through the wound in the neck or from the exposed sinus, these regions being carefully covered by pads of sterile gauze, held by assistants, so as to maintain a thoroughly aseptic field of operation. The next day the patient seemed decidedly brighter, and the pulse was about 100. There was a free exudation of serum from the incision in the cerebellum; this discharge was so profuse that all the dressings were saturated. From this time on the dressings were changed every day. At the first dressing a large hernia cerebelli was found consisting mainly of granulation tissue and blood clot, with some brain tissue; portions of this were removed at each dressing. For eight days after the operation the patient continued to improve. On about the fourth day after the operation he seemed slightly dull, and took his nourishment with some difficulty. In twenty-four hours, however, this difficulty had passed away, and the child seemed to be doing well, as I have said, on the eighth day after the operation. The hernia, however, still remained large, and portions of the mass were removed at each dressing. The wound in the neck resulting from the removal of the jugular, gradually became healthy; there was no breaking down of the wound, excepting of the upper and lower extremities before mentioned, and the pus discharge from this was very slight at this time. On the ninth day, after the second operation, the patient seemed remarkably well; he appeared brighter, took his nourishment well, the pulse was fair in quality, and he seemed in every way better. Early on the morning of the tenth day, after the second operation, the child suddenly went into collapse, the breathing became rapid, and he died early in the afternoon of the tenth day.

For the pathological report of this case I am deeply indebted to my friend and colleague, Dr. George S. Dixon, and it is with his collaboration that the following portion of the paper is written. The aural pus showed the presence of pneumococci, and the clot taken from the sinus at the time of the operation, showed the presence of a diplococcus and of an unidentified bacillus. Dr. Dixon is inclined to believe that the diplococcus found in the sinus was a pneumococcus, identical with that found in the aural pus.

The report of the autopsy is as follows:

External examination.—Both pupils dilated, the right slightly more than the left. A hernia protuded from the mastoid wound on the right side. The operative wound along the inner border of the sterno mastoid muscle was healed in the middle, but open at both ends; very little pus was present.

Examination of the cranial cavity.—A moderate serous leptomeningitis was present. A small amount of plastic lymph was found along the left side of the longitudinal fissure. Within the longitudinal fissure was normal on both sides. There were adhesions about the mastoid wound and also about the foramen magnum. A clot of considerable size was found attached to the extreme upper end of the cord posteriorly, and extending into the vertebral canal. It had the appearance of membrane carrying extravasated blood. At least two-thirds of the right cerebellar lobe was destroyed. A blood clot estimated as two inches long, one inch wide and from a third to a quarter inch thick, was found in the cerebellar fossa, which was probably post-mortem. All portions of the base of the skull were normal, the right mastoid region of course excepted; the ventricles were normal, except the fourth. The only abnormality here was an opening, about the size and shape of the end of an ordinary grooved director, through the lower part of the wall on the right side.

The hernia was composed mainly of red and white (polynuclear) blood cells held together by fibrin and necrotic cerebellar tissue; the surface presented in sections, numerous diplococci and a bacillus, both organisms apparently being the same as those found in the specimen of the sinus submitted for examination. The diplococci found in the sec-

tions were probably pneumococci, as the aural pus presented this germ on previous examination. The membranous-looking mass passing into the posterior portion of the vertebral canal, proved to be a clot, carrying a large number of leucocytes; no germs were found in it.

The cause of death was undoubtedly hemorrhage into the spinal canal. A further examination of the cerebellum showed that the cerebellar tissue adjacent to the broken down or hernial tissue, presented an infiltration of leucocytes in layers or striae for a short distance inward. There were no broken down areas or evidences of deposits of pus, such as would occur in a pure encephalitis, in the deeper portion of the cerebellar lobe below the base of the hernia.

The infiltration, mentioned above, in the deep cerebellar tissue, occurred in that portion of the cerebellum which lay very close to the infected sinus. It seems probable, from a clinical point of view, that this infection spread through the wall of the sinus and attacked the deeper cerebellar tissue, and that later a more extensive infiltration of the cerebellar lobe occurred, giving rise to pressure symptoms, which necessitated the second operation. On incising the cerebellum, it will be remembered that the tissue seemed exceedingly soft, and that broken down tissue exuded from between the edges of the incision. It seems more than probable, therefore, that the infection spreading in the deeper portion of the cerebellum was responsible for this softening; and that this infection not only spread to the cerebellar tissue, but also to the ependyma, giving rise to the serous collection found in the ventricle at the time of the operation. This edematous condition of the cerebellum would account for the increased pressure in the cerebellar fossa, and the extensive hernia cerebelli. The fact that the germs found on the surface of the cerebellar hernia were identical with those found in the aural pus, at the time of the first examination, would seem to show that the infection had extended directly from within outward, in the manner described. As the patient was doing well until a few hours before death, it seems evident that the rupture of some large vein at the base of the cerebellum was responsible for the death. Had this accident not occurred, it seems more than probable that the patient would have recovered completely.

The case is of interest not only from a pathological, but also from a clinical point of view. We have ordinarily been taught to believe that the fourth ventricle could hardly be entered with safety. In this case the fourth ventricle was opened, and yet the patient survived the operation more than a week; that the cause of death was in no way connected with the opening in the fourth ventricle, the autopsy clearly proved.

I have previously reported a single case in which the fourth ventricle was opened during an exploration of the cerebellum, and in this case also, although the patient lived a number of days after the operation, there was absolutely no inflammation of the lining membrane of the ventricle.

XLIV.

IMPRESSIONS OF THE EFFICIENCY OF PROFESSOR DUNBAR'S ANTITOXIN IN HAY FEVER.*

BY SIR FELIX SEMON, C.V.O., M.D., F.R.C.P.

PHYSICIAN EXTRAORDINARY TO HIS MAJESTY THE KING.

Two causes have combined to retard the appearance of the following paper. In the first place, the weather has been so abnormally cold this year in and around London during the first part of the hay fever season proper that the affection not only made its appearance a good deal later than in ordinary years, but also that the attacks when arising in very many cases were of an abortive nature, that is, that patients who had had the usual warnings of the approach of their enemy, such as itching and irritation of the eyes, sneezing fits, obstruction of the nose, wheezing and actual asthma on one day, and who fully expected that they were in for the annual attack, were pleasantly surprised to find next morning that all the symptoms had gone. It is obvious that trying the antitoxin under such conditions would very likely have led one to form very erroneous conclusions, inasmuch as the effects which one might have attributed to the action of the remedy would in reality have been due to the abnormally wet and cold weather, which prevented the pollen from penetrating into the eyes and nose of those predisposed to hay fever.

Secondly, an even more powerful factor militated against the earlier appearance of this report, namely, the really enormous difficulty of arriving at reliable conclusions with regard to the effects of the new remedy. I do not exaggerate when I say that I have never in any scientific inquiry in which I have been engaged found such difficulties in satisfying my own mind concerning what I ought to report as in this question. After the results of the experiments with Professor

*From the British Medical Journal, July 18, 1903.

Dunbar's toxin and antitoxin, which I published in the British Medical Journal of March 28, of this year, I was quite prepared to find that the effect of the new remedy would be variable in intensity in different hay fever patients, but the differences which I have actually found are so great that it is a matter of extreme difficulty for a conscientious observer to briefly summarize the effects of the new remedy. Not only do different people react surprisingly differently but also in one and the same person the effects of the remedy in some instances vary from day to day without a satisfactory explanation of these differences being forthcoming. This is, perhaps, not much to be wondered at, seeing the capricious nature of the disease itself and its ever varying intensity not only in different cases, but in one and the same case, according to external circumstances. All the same, it is not a satisfactory state of matters, and I have, therefore, preferred to speak in the title of my communication of "impressions" rather than of results obtained' because it is quite possible that further experiences may considerably modify in a more favorable or in the opposite sense, the views I have so far formed. Anyhow, I thought it right to state now what I think of the antitoxin treatment in order that it may be tried on a larger scale.

The following remarks are based upon observations on eight hay fever patients whom I have personally treated, since the conditions of the weather have become normal enough to make it permissible to draw conclusions from the use of the remedy. In all these cases I have carried out the treatment personally, and not placed, until a few days ago, the remedy into the hands of the patients themselves for the following reason: Previous to the commencement of the season I inquired from Professor Dunbar and Dr. Prausnitz whether one ought not to try to ward off the attack altogether by subcutaneous injections of the antitoxin. Dr. Prausnitz dissuaded me from carrying this idea into effect by stating that this experiment had already been made in Hamburg with the result that in some people predisposed to hay fever, subcutaneous injection of the antitoxin had been followed by a swelling of the arm into which the injection had been made, lasting for several days, and accompanied by

erythema and urticara. This statement has quite recently been publicly corroborated by Professor Dunbar himself in a paper which he read before the Medical Society of Hamburg and which has been published in the *Berliner klinische Wochenschrift*, of June 15th, 22nd and 29th. In this paper he states verbatim on page 597:

"Although the hay fever antitoxin when applied subcutaneously produces no symptoms whatever in normal individuals, so far as our present investigations go, it yields when hypodermically used in hay fever patients irritative phenomena which have rather disagreeable effects. If, for instance, the antitoxin is injected into the forearm, a swelling arises starting from the spot where the injection was made, which may extend over the whole forearm, accompanied by a sensation of heat, redness of the skin and disagreeable itching. These phenomena might last up to six days. It appears, however, as if a sort of immunity against these phenomena developed up to a certain degree when the serum has been applied hypodermically several times. It would also appear as if these phenomena did not arise in all hay fever patients."

From Dr. Prausnitz's communication it was obvious to me that the antitoxin as at present used must still contain certain toxic or septic properties, which cause the disagreeable symptoms described when the remedy is injected under the skin. That Professor Dunbar himself shares this view appears from the following paragraph in the paper to which I have just referred:

"It must by no means be concluded that we may not succeed later on in freeing the antitoxic serum from these properties which give rise to the production of the by-effects described. It could be shown that whilst the power of the antitoxin increased, the by-effects not only did not rise proportionately, but rather diminished. From this I think I may conclude that the by-effects have no relationship to the specific antitoxic substance, and that by removing these bodies the efficiency of the serum will not be interfered with."

However that may be, it seems certain that at the present moment the antitoxic serum is not quite free from toxic prop-

erties, and it was only natural to deduce that, although resorption of these toxic substances would naturally take place more rapidly and intensely from hypodermic injection, similar, although less violent, effects might be produced if the remedy were frequently administered direct to the affected parts. Certain experiences made in hay fever with long continued applications of cocain lent weight to this view, and it seemed only right that the remedy ought to be placed into the hands of laymen before sufficient experiences had been collected showing that no danger was to be apprehended from resorption of the antitoxin from mucous membranes. This was the reason why I protested in my "Disclaimer" of May 23rd against the premature sale of the remedy and why up to the last few days I have made all applications of the antitoxin personally.

Having, however, so far met with no untoward by-effects of any kind in my limited experience I think that reasonable patients may be trusted with the self-administration of the antitoxin, provided always that they are warned against over-using the remedy, inasmuch as under such circumstances I even now consider it by no means impossible that ultimately disagreeable by-effects similar to those observed after subcutaneous injection of the remedy may develop. In my trials I have partly used preparations of the 1 in 500 antitoxin, with equal quantities of normal horse serum, which I mixed myself, the antitoxin and serum having been kindly sent to me by Professor Dunbar, partly with the ready-made preparation, to which the name of "pollantin" has been given. As sent out by the manufacturers, the remedy is put up in a small case containing two wooden boxes, one of which incloses a phial with the serum, and the other an empty glass provided with a drop pipette, with the following directions:

"As the serum would soon become contaminated by frequent contact with the pipette, it is advisable to pour out one-third of the contents of the serum phial into the empty glass provided with a drop pipette. This glass is effectually closed by pressing the india rubber cap of the pipette into it, but care should be taken to keep this glass upright so as to avoid the liquid flowing into the cap. Patients should not fail to carry a small quantity of serum in this glass about with them

whenever they may expect a hay fever attack. Immediately after noticing the first symptoms of irritation in nose or eye, a drop or two of the serum should be instilled upon the eye or into the nose affected.

"The serum can be applied to the eye in the following manner: After sucking up a few drops into the pipette, exert a gentle pressure on the rubber cap until one drop just emerges from the opening of the pipette; then before a mirror carefully approach the pipette to the outer corner of the eyelid, when the drop is sucked up by the eyelashes, and spreads over the conjunctival membrane. By the aid of a pocket mirror the same manipulation can easily be carried out in the open air.

"In order to instil the serum in the nasal cavity, fill the pipette with 3 or 4 drops of serum, and, bending your head backward, insert the pipette about $\frac{1}{2}$ in. into the nostril affected, and empty it by a short pressure on the rubber cap. A few sniffs suffice to spread the serum over the mucous membrane."

The phial containing the serum is closed by a cork, and I here wish to express an earnest hope that the manufacturers may see their way to provide better corks. As it is, I have found that in the majority of cases the cork, which usually is unnecessarily deeply rammed down into the phial, breaks off, however carefully one may attempt to remove it and that endeavors to subsequently extract the remaining larger part of the cork often results in breakage of the upper part of the tube. Seeing the very high price of the remedy—the apparatus above described costs 10s.—it might surely be expected that only the best sort of cork, or, better still, rubber plugs, should be used, or that some more commodious and less fragile form of preserving the serum should be devised. Furthermore, the drop pipette is rather short when the rubber cap is applied for the sucking up of every drop of the precious fluid, a quantity of which is thus apt to be lost each time the remedy is used. Again the glass bottles not rarely stick fast in their wooden enclosures and cannot be removed. Altogether the technical question is far from having been solved in an ideal matter.

As to the application itself, I have in each case strictly

followed the directions given in the printed slip enclosed in the box containing the remedy. In a number of cases the application was made once daily, in others twice, whilst in two cases it was used as often as three times a day.

I may summarize the impressions I have received by saying that, as one would have anticipated from the nature of the affection itself in which unfortunately during the critical time almost constant reinfection takes place, and from the results of the experiments described in my previous communication, that the remedy in its present form of application is not curative, that is, that one must not expect that a single application will ward off or cure the disease for any prolonged period. Whether with greater perfection of the serum and abolition of the unpleasant by-effects caused by hypodermic injection that great desideratum will ever be accomplished remains to be seen. Certain it is that at present the serum does not possess that power.

It would, however, certainly be a great enough gain if, by repeated application to the eyes and nostrils, the occurrence of an attack could with certainty be prevented for a limited period, and a fully established attack be cut short or rendered less unpleasant. I may at once say that in several of my cases installation of one drop of serum into each eye and two drops into each nostril appears, indeed, to have had the effect of warding off an attack, which otherwise, according to the considerable experience of these patients, would have almost certainly have occurred, for a period of several hours, four to five on the average. In two of my cases this effect was so marked that auto-suggestion seemed to be practically out of the question. Unfortunately, however, even in these cases, this happy effect did not invariably occur, the remedy failing, for some unexplained reason, on individual occasions. Whether in these instances the failure was due to the fact that besides the pollen infection, the nervous temperament of those predisposed certainly plays a great role in the production of an attack, and that, for some reason or other on these particular occasions, the nervous element overwhelmed the effects of the antitoxin, I must leave an open question. The fact remains that in none of my cases could the effect of the application of the remedy be reckoned upon as a cer-

tainty. In other cases the effects were much less marked. In one or two itching of the eyes, sneezing fits, running of watery fluid from the nose, etc., recommended very shortly after the application of the remedy, and in the one case amongst my eight patients in which asthma played a predominant and very disagreeable role this was not affected at all by repeated use of the remedy. The facts above stated will perhaps become more apparent from the reports of some of the patients which I append at the end of my paper.

With regard to the cutting short of fully established attacks, I cannot say that I have observed any marked effects, with the exception that so far as the irritation of the eyes is concerned all my eight patients immediately after application of the remedy experienced a sense of relief, the duration of which was, however, very variable.

To sum up: I can unfortunately not say that the remedy has in any sense acted as a panacea in any of my cases. It has given relief in some, and appears to have acted beneficially certainly in postponing the occurrence of the attack in others of my patients. Possibly these effects might have been even more marked had the applications been made with even greater frequency. I ought also to say here that according to the spontaneous statements of at least two of my patients it appears to have had the effect of making the present hay fever period altogether a good deal more tolerable than on previous occasions.

The main applicability of the serum would certainly seem to be in the direction of its postponing for several hours the occurrence of the regular attack. If further experiences should show that prolonged and frequent application neither diminishes its efficiency nor causes unpleasant by-effects even the limited results above described will have not inconsiderably added to our therapeutic power of combating this troublesome affection; but whether this will be so I do not dare to say at present. I am quite willing to modify my impressions with furthermore extensive experience. The statements made in this paper, however, represent the impressions I have so far gained.

APPENDIX.

DR. L. O.

June 29th, 1903.—11. a. m. Serum introduced into both nostrils, and a drop placed on carunculae.

11.30 a. m. Secretion started from right nostril and continued until

12.30 a. m., when patient had a bad attack.

2 p. m. Attack had passed off, and patient was quite free until

5 p. m., when an acute attack started, and got gradually worse until 11 p. m. accompanied by acute conjunctivitis for the six hours.

The nostrils were very stuffy all night.

June 30th.—Much better in the early morning and until 11.40 a. m. Serum introduced.

11.40 a. m. Slight attack, after which patient was quite free until 5 30 p. m. when an attack came on.

7.30 p. m. Serum again introduced; quite free from attack until

11.30 p. m. Slight attack, again free until

July 1st, 3.45 a. m.—Slight attack; nostrils seemed completely closed, as they always are at night during the hay fever season, and usually slight asthma in addition.

10 a. m. Slight attack.

11 a. m. Serum again used.

4 p. m. Slight attack, which continued on and off until 7 p. m.

7 p. m. Used antitoxin with immediate relief. This is the first time that patient has found the antitoxin to be successful immediately.

July 2nd.—Three or four slight attacks during the day.

8 p. m. Antitoxin.

10 p. m. Slight attack.

11.15 p. m. Antitoxin. Much better night, and did not awake up until early in the morning of July 3rd with the stuffy feeling in the nostrils as usual after sleeping during hay fever season.

7.45 a. m. Usual morning attack.

7.50 a. m. Antitoxin. Complete immediate relief from conjunctival irritation.

9.45 a. m. Attack severe, nasal discharge copious, conjunctival irritation very severe. Very little relief from antitoxin as had very little left to experiment with.

10.45 a. m. Attack still continuing. No antitoxin.

4.45 p. m. Another attack.

6. p. m. Attack very severe.

7. p. m. Worse.

11 45 p. m. Slight attack. No attack between 7.30 p. m. and

11.45 p. m. Good night. No attack took place until

July 4th.—8 a. m. Attack lasting for half an hour.

9.30 a. m. Another attack fairly severe.

10.30 a. m. Attack still continuing.

11 a. m. Nearly stopped, with the exception of slight nasal discharge from both nostrils.

The patient sums up the results in his case by saying that the antitoxin diminishes the frequency and duration of the attacks, and is most useful if one assists by staying in the house, and not venturing more than is quite necessary into the sun. He also emphasizes the fact that the attacks increased in severity when he had no more antitoxin.

B. H.

June 16th.—Antitoxin instilled into eyes in the afternoon. Immediate soothing, though not very pronounced, effect was experienced. Forty-five minutes later, itching in nose, and sneezing again occurred. Hay fever symptoms all the even ing quite as severe as usual.

June 17th.—Eyes and nose considerably inflamed. On going out itching in nose and eyes and inclination to sneeze.

10.50 a. m. Antitoxin applied to eyes and nose. Immediate feeling of relief, cessation of itching, condition of eyes and nose improved for about an hour.

12.30 p. m. Slight return of symptoms, growing gradually worse, as the patient traveled home into the country by train. Great discomfort, which subsided after three or four hours indoors. Patient felt much more perceptible feeling of relief after the application to-day than he had on the previous day.

June 20th.—6 p. m. Antitoxin applied to the eyes. Some

feeling of relief as on previous occasions, and eyes steadily improved for two hours not itching at all during the evening, which was, however, cool and damp.

June 23rd,—Antitoxin applied to eyes and nose. Relief felt, but only for about twenty-five minutes, when sneezing, etc., returned. Worse during the evening, with eyes and nose running freely, and a good deal of tightness on the chest.

After prophylactic injection in the mornings of June 27th and 28th, remaining practically quite free from symptoms on both days, although the patient is quite certain that he would otherwise have suffered very badly.

Miss C.

June 22nd.—1 p. m. Antitoxin dropped into both eyes and nostrils. Right eye stopped irritating, but not much improvement otherwise.

4.15 p. m. Bad sneezing fit, partial obstruction of nose, headache.

7.15 p. m. Bad sneezing fit. Irritation in right eye, complete or partial obstruction of nose, etc., with sneezing fits continue all the evening. The left eye which had been free during the day from irritation, starts intense irritation at 11 o'clock. Asthma during the night.

June 23rd.—7.30 a. m. Bad sneezing fit. Eyes irritating. Head aching.

11.30 a. m. One drop of antitoxin into both eyes and left nostril and two drops into right nostril. After twenty-five minutes no improvement whatever has resulted. The eyes are still irritating and itching, the right nostril is completely occluded. Patient has severe occipital headache. Feels during the rest of the day very ill with asthma, violent headache, varying obstruction of nostrils, coughing fit, etc., although both eyes stopped irritating from 12.30 to 7.30.

June 24.—Antitoxin applied to eyes and nose during the forenoon. Shortly after the eyes cease irritating right nostril becomes free, left remains obstructed. This continues till 6.30 p. m., when all the symptoms more or less return, and continue all the evening, except that the right nostril remains free whilst the left is the whole time obstructed. There is a great deal of asthma and sneezing.

June 25th.—12.30 p. m. Two drops of antitoxin into each eye, and two into right, two into right nostril; none in left.

1 p. m. Left eye ceases irritating. Right nostril still stopped up completely.

1.30. Right eye ceases irritating.

2 p. m. Right nostril free. Left, into which no antitoxin was introduced, stopped up. This continues so all afternoon.

7 p. m. Return of sneezing; eye irritation, nostrils remain the same. Sneezing, irritation, asthma through the evening, and early morning, when, however, at 8a. m., June 26th, the left nostril is free and the right stopped up.

June 26th.—One drop of antitoxin in each eye and each nostril, but with the exception that the eyes are free from irritation for a short time not much relief is experienced on this day, there being sneezing fits every half hour, perpetual eye irritation, asthma, etc., these symptoms being also present early next morning.

June 27th.—12 a. m. One drop of antitoxin into each eye and each nostril. No improvement till 3 p. m., after which the patient is quite free from symptoms until 7 p. m. From 7.10 p. m. the symptoms are again present with asthma superadded later on.

Sunday, June 28th.—No antitoxin. Symptoms present all day.

Miss R.

June 23rd, 1903.—3 p. m. General feeling of feverish discomfort. Stuffy and heavy feeling in head, but no acute irritation in eyes or nose. Sore throat and chest.

3.30 p. m. Injection of antitoxin in both eyes and both nostrils. No immediate results took place.

4 p. m. Sneezed three times.

4.20. Violent sneezing fit, lasting quite five minutes, and sneezing the whole time. The heaviness and general discomfort did not abate at all during the evening, but the eyes remained free from irritation, and the soreness of throat and chest seemed to pass away. Constant watery discharge from the nostrils continued, with an occasional sneeze.

June 24th.—5.45 p. m. Instilled one drop of antitoxin into each nostril.

6 p. m. Sneezing. Gradually the nostrils became more comfortable, the discharge and sneezing stopped, and patient remained throughout the following day, the 25th, unusually free from symptoms in spite of being out a great deal in sun and heat, and of its being a typical hay fever day. No irritation in eyes experienced since application of antitoxin on the 23rd.

June 26th.—Extreme irritation in both nostrils, sneezing and discharge. General feverish, wretched feeling.

10.45 a. m. One drop into each nostril. No effect for half an hour then a gradual but very decided improvement took place both in local and general condition.

June 27th.—3 p. m. Prophylactic instillation of two drops into each nostril before going out. Great discomfort all afternoon and evening, all the symptoms being more or less present and very marked.

June 28th.—Very uncomfortable day in spite of remaining indoors. No injection made till 6 p. m., previous to going out. Slight symptoms present all the evening.

June 29th.—8.30 a. m. Two drops into each nostril. Remained comparatively free all morning. Very bad afternoon.

This patient sums up the results of the remedy in her case by saying that on the one day when the remedy was used three times considerable relief was obtained, there being almost complete absence of symptoms. On other days when the remedy was used less frequently the effect was variable, on one or two occasions relief being experienced, whilst on at least two occasions the remedy completely failed. The eyes were, however, always relieved.

XLV.

ETIOLOGY AND SPECIFIC THERAPY OF HAY
FEVER.*

BY PROF. DUNBAR.

TRANSLATED BY OTTO JOACHIM, M. D., NEW ORLEANS.

Through the kind invitation of the President, I am able to present the report on the investigation of hay fever, which Dr. Thost and the author have already announced, at this meeting, which is the last scientific session before the hay-fever season. This is highly appreciated as it is intended to consider conditions which can be demonstrated successfully and free from objections only in seasons free from hay fever.

The historical development of our knowledge of the nature and cause of hay fever needs but brief reference in Hamburg where Drs. Fink, Ferber, Thost and others have published valuable contributions and where this condition has been a subject of study for many years. The publications of Dr. John Bostock, of London, in 1819, made the knowledge of hay fever a matter of common property in the medical world. The symptoms of hay fever, which Dr. Bostock fully, correctly and comprehensively described, will be the subject of Dr. Thost's paper. It is only necessary to state that hay fever in Hamburg and its surrounding districts begins about the end of May or the beginning of June, and affects certain persons regularly every year with a tickling, itching and burning sensation of the mucous membranes of the eyes and nose lasting six to eight weeks and frequently complicated with asthma and the other accompanying corresponding conditions.

Whether hay fever existed before Bostock's publication is difficult to decide. Some authors hold that this disease

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first appeared about the middle of the eighteenth century, while others believe that they find evidence in literature that hay fever existed already 400 years ago. It may be assumed as certain that hay fever was in Bostock's time quite prevalent, as the correctness of his observations was at once confirmed from many sources.

Almost all contemporaneous authors agree that hay fever is possible only when two factors combine—that of a certain existing agent with a person predisposed to it. It is intended to furnish hereafter proofs of the existence of a hay-fever diathesis. The percentage of people predisposed to hay fever is very small compared to the whole number, but their total nevertheless must be quite large. A general estimate of 100,000 has been given. It is probable that several times this number is nearer correct. Hay fever prevails in the United States and England more so than elsewhere. The number of hay fever patients in Germany seems to be quite considerable, while in other countries it is said it exists rarely, or not at all. Whether this fact is accounted for by a racial disposition or by greater abundance of the existing agent of hay fever, in the United States, England and Germany than in other countries, is a question at present not pertinent.

The nature of hay fever has at different times been explained in different ways. Bostock, Phoebus and other investigators regarded the first hot period of the summer as the existing agent; Helmholtz regarded hay fever as a disease due to bacteria; other observers attributed hay fever to odoriferous substances or other emanations of grasses and hay. Elliotson was the first to attribute the disease to plant pollen.

Blakely agreed with this view, and substantiated it through investigations of a great number of plants.

Blakely arrived at the conviction that every variety of pollen acts as exciting cause for hay fever and left the possibility open that other causes may also produce the disease. These views were generally accepted as correct until within the last ten years some contrary opinions were propounded. Of late a number of authors have reverted to the views held by Helmholtz and contended that hay fever was a disease due to bacteria. Other authors returned to the theory that odor-

iferous substances or etherial oils which emanate from flowering plants were the exciting agents in the production of hay fever.

In reporting the following personal observations it is proper to say that until recent years it was the author's opinion that those were right who held microorganisms to be the cause of hay fever, yet these later investigations are considered to demonstrate positively that hay fever is a disease not due to bacteria. The author's observations on bacterial findings in hay fever furnish an illustration of another instance which shows that the continuous, exclusive and abundant presence of certain bacteria is of itself no certain basis for attributing to them an etiological importance for the disease under investigation. It is possible that the bacteria which were observed, found extremely favorable conditions for their development in the secreted mucus of the body temperature. The question as to whether hayfever is an infectious disease or not was solved by alternating exposure to the cause during the time of prevailing hay fever, which in this part of the country according to common observation is found to be universally distributed in the air on dry and sunny days—and immediate withdrawal from the supposed hurtful influences of exposure. The prompt subsidence of the symptoms of irritation produced by exposure to air when by suitable means the admission of air was prevented seemed of importance. If by shutting out fresh air the symptoms subsided, a bacterial cause in the nature of an infectious disease could be excluded. Hay fever attacks appear quickly and with certainty as all hay fever patients know when riding on a railroad train. Experiments, as those above indicated, can readily be made on trains when the opportunity is afforded, as it is in compartment cars, to open and close the windows at will. The observation was repeatedly made on such occasions that the attacks of hay fever subsided, when entrance of fresh air was prevented by closing of the windows, and broke out anew when the windows were opened. It is important to state that the disposition to attack varies considerably even in the same individual at various times of the day. Attacks which have for instance been excited in the afternoon and have subsided by night, may

again reappear in the early morning hour, without renewed exposure to the exciting agent. These observations confirmed the supposition that hay fever was not an infectious disease and that the theory of a living excitent, susceptible of multiplication within the body of the hay fever patient could not be entertained.

Observations of the last few years led back to the supposition that flowering grasses had a causative relation to hay fever. It was early evident that clearness as to the etiology of hay fever in view of contradictory opinions expressed in hundreds of publications could only be obtained if it were possible to isolate the exiting agent, pure and separated from foreign elements, and capable of exciting all the symptoms of hay fever, irrespective of temperature and conditions of weather and in other than the hay fever seasons; it was thought to be necessary further to demonstrate that this excitant was only active on persons susceptible to hay fever and innocuous to other persons, even if used in excessive dosage. If grasses are cut when their growth has so far progressed as to show the first beginning of flowering and set in a container with water in a sunny place, they will continue their development quickly and fully. When the plants are gently touched they will shed a yellow fine powder, which microscopic examination shows to be composed of pure pollen. These should be collected in sterile glass jars held under them and it is possible to obtain them at times free from bacteria. When some of this pollen, collected in the way suggested, is brought in contact with the conjunctiva or nasal mucous membrane or any other mucous membrane of a hay fever patient, an itching, tickling and burning sensation will be complained of within five minutes in the infected locality, followed by an evident vascular injection, swelling and excessive secretion. Some exceptions to this rule will be referred to later. These pollen granules can be easily preserved and kept indefinitely in a desicator, if spread in a thin layer in sterile flat glass jars in their full activity and productive of the above described reactions in hay fever patient at all times of the year.

Having established these facts, it was necessary to learn if hay fever patients would show a greater sensitiveness

than normal persons to other foreign bodies, or if it was only the pollen of the gramineae were productive of hay fever attacks, or if possibly the pollen of other plants as well were capable of producing such attacks, or if it was only the pollen of certain varieties of grasses or if all grasses contained the active agent causing hay fever reactions in persons susceptible to the disease.

Until recently it has been impossible to find other substances besides the pollen of the gramineae, which were productive of reactive irritation in hay fever patients and entirely inert when used on all other persons. Experiments with soot, dust and various other substances have been made with negative result.

The pollen of 50 different plants not belonging to the gramineae were unable to produce reactive symptoms in hay fever patients. On the other hand, all of the 25 varieties of grass pollen examined up to this time produced active symptoms on hay fever patients. Besides, the grasses belonging to the family of gramineae, the ried grasses, which are closely allied to the gramineae, possess active pollen. It would, therefore, be more correct to say that not only all the gramineae, but all the grasses examined, had pollen productive of active reactions on hay fever patients. Besides the grasses examined which had active pollen, the pollen of rye, barley, wheat, corn, rice and many other varieties, mentioned in a previous publication, proved capable of producing reactive irritation in hay fever patients. The nature of the reaction produced by the pollen of the different grasses examined was altogether identical though considerable difference in the intensity of reaction was noticeable in different varieties of grasses. Twenty-five hay fever patients have so far been examined with the pollen of the gramineae family, and all of these responded in an entirely analogous manner to the inoculation. Of 40 normal persons, who have subjected themselves, at the author's request, to the effects of the pollen, objective symptoms were observed in none. The appearance after inoculation of certain subjective irritations on otherwise normal persons, and the positive reaction on some and the negative reaction noted on others affected with nervous coryza will be taken up later. The effects of the pollen

on persons affected with nervous asthma will also receive mention later. The experiments showed great variations in the sensitiveness of different hay fever patients toward the action of the pollen, that is to say, that the limit at which irritation is endured is variably high in different hay fever patients. The irritation is, however, present in all cases, and the symptoms induced are identical objectively and subjectively. The accompanying symptoms like headache, migraine, etc., correspond entirely to the symptoms observed in many patients in natural hay fever. It is not probable that a gradual heightening of sensitiveness from the normal condition to that of the hay fever patient exists because a large number of patients examined were able to show, without subjective or objective signs of reaction, 20 times the dose which invariably has proved sufficient for the production of active reaction in hay fever patients. Certain conditions seem, however, to exist which form the transitory stage between the normal person and the hay fever patient. The experiments made gave a reasonable basis for the conclusion that a group of persons exist who show a specific susceptibility to irritation by the pollen of grasses, which shows itself by evidences produced on three persons by the application of grass pollen to their mucous membranes and by the production of symptoms corresponding to hay fever. It is as yet impossible to say that there are persons who do not react to pollen of grasses, but to pollen of other plants in a similar manner. Should it be possible to prove that such persons can be found it would still be proper in view of the absolutely individual results of the experiments on a relatively large number of people to regard persons susceptible to specific reaction from grass pollen as hay fever patients.

These experimental results make it impossible to look upon hay fever as a nervous coryza and difficult to differentiate from it.

*After the above report was submitted it was found possible to prove that the pollen grains of the lily of the valley were capable of exciting specific reaction in hay fever patients. This undoubted highly interesting scientific fact is practically of no great moment in regard to the etiology of hay fever inasmuch as the lilies of the valley do not, like the grasses, disseminate pollen through the air.

The evident fact that some persons suffer from a nervous coryza who do not react to the application of the pollen granules of the gramineae order, like regular hay fever patients, gives us a strong index for the separation of the reacting from the non-reacting patients, and to classify them either as hay fever patients or belonging to another as yet not understood affection. The results of further experiments have led me to the conclusion that the grass pollen granules contain the exciting agent of the disease called by almost all authors hay fever, which is differentiated from all other similar affections essentially by the fact that it appears in the affected persons only at the above mentioned period of the year. These attacks appear in all patients living in the same district on the same day almost simultaneously, like at command, and they disappear in all patients at the same time for the rest of the year. The importance of these facts has been overlooked by the authors who still hold hay fever identical with general nervous coryza.

The positive conclusion of the causative effect of pollen granules of the grasses in the production of hay fever led to the inquiry of the chemical or mechanical action of these bodies. The exterior construction of the plant's pollen at first gave rise to the supposition that they merely cause hay fever. The pollen granules of many plants are densely covered with minute and very fine points. It was supposed that these thorns were the agents toward which hay fever patients were extremely sensitive. Among the many varieties of pollen covered with thorns and prominences so far examined not a single variety was found producing a reaction on hay fever patients. The pollen granules of grasses found active on hay fever patients had without exception a smooth surface, which is also the same with the pollen granules of the lily of the valley. As it was evident that chemical and not mechanical irritation had to be considered, it was necessary to inquire whether odorous substances, etherial oils or similar properties were the active agents.

All products obtained from the pollen granules by the action of alcohol, ether, alcoholic ether upon them had no specific effects upon hay fever patients. They were mostly entirely inert. The etherial oils, however, produced intense

irritation upon the mucous membrane. These reactions are of an entirely different kind from those observed in hay fever and their effects are apparent in others as well as in hay fever patients. These materials come, under normal circumstances, in contact with the mucous membrane of our eyes and nose in such dilution that they are not felt, because the point of irritation has not been approached. Decisive, however, is the fact that the pollen granules retained their specific action on hay fever patients in full force after the extraction of the odorous substances, etherial oils, and other products with alcohol, ether, etc. The pollen of the gramineae differ from pollen of other plants in so far as they contain starch granules, which, as a rule, seem to entirely fill the body of the pollen. When immersed in water the starch bodies of the pollen remain for days and appear as bacteria like rods. They will hereafter be referred to as "starch rods." When immersed in physiologic salt solution they often remain unaffected. When immersed, however, in secretions of mucous membranes, in lachrymal, in nasal or salivary secretions, or in blood serum, and kept at body heat, these starch rods will soon begin to dissolve and to melt, much like sugar melts in water.

If at the moment of complete solution of the starch rods the undissolved portion be separated from the solution by centrifugal process it will be found that the undissolved portion is inert in its effects on hay fever patients. With the solution hay fever can be produced. This observation suggested the conclusion that the active substance of the gramineae grass pollen resided in the starch rods or could be found in connection with them. The iodine reaction of the starch rods is somewhat atypical, as it is not always blue, but at times violet-red. This suggested the idea of a double product probably containing besides starch an albuminous substance. It seemed extremely difficult to decide upon this in view of the extreme minuteness of the proportion. It was finally possible to arrive at the conclusion that the starch rods were not the exciting agent of the hay fever poison. The solubility of the starch granules contained in the pollen diminished in proportion to their dessication. Whenever the dried pollen was pulverized and suspended in a normal

salt solution the centrifugal separation showed a deposit arranged in layers, of which one was a pure white substance, which a microscopic examination showed to be the pure starch rods. The isolation of this layer and its repeated washing produced starch in its pure form and it was possible to demonstrate the entire inertness of this substance on hay fever patients.

The proportion of oxygen contained in the pollen of the gramineae indicated about 25-30 per cent. of albumen. This albuminous substance was extracted with salt solution from the pulverized pollen and deposited by addition of alcohol, after centrifugal separation of the insoluble constituents therefrom.

This sediment, which reacts to all tests for albumen, contains the entire hay fever poison, and it is possible to extract it by this method so completely from the pollen granules that the residue is entirely inert. These albuminous substances obtained in the manner described show in guaiac solution by addition of hydrogen peroxide a blue color, indicating an enzymic reaction. They have proteolytic properties and show other enzymic activity. Various reasons suggested the poison of hay fever to be of enzymic nature. Inasmuch as the enzymes cannot be separated from the albuminous substances, and are probably of similar nature, it seemed very difficult to decide whether the enzymes possessed the active hay fever poisons or not. A lucky accident was responsible for its solution. A testtube containing about 5 gr. of pollen of corn had been taken along on a journey and they appeared to become fluid. Having no opportunity to determine if such was due to bacterial decomposition, and being at that time without precise knowledge of the nature of the poison, a small quantity of carbolic acid was added to the contents of the tube, to stop the supposed activity of the decomposing bacteria. Later examination of the contents of this tube proved that the addition of carbolic acid had rendered the pollen of corn inert on hay fever patients, but it yet retained active enzymes of various kinds, a proteolytic and a diastatic ferment and an enzyme. The action of the enzymes was therefore not abolished by the addition of the carbolic acid, only the action of the poison. It can therefore

be concluded that the hay fever poison is not inherent in the enzymes. The reverse experiment to kill the action of the enzymes without neutralizing the hay fever toxin has as yet not been successful. Heating to 70° C. destroys the toxin as well as the enzymes. Further experiments on this line are being pressed, and it is worthy of notice that pollen toxin, as hay fever poison may properly be termed, is extremely sensitive to acids and alkalies. It is at present to no purpose to enter upon the chemical nature of the pollen toxin. It is sufficient to say that it is an albuminous substance or found in connection with it, and we are in a position to isolate the active substance by extracting it with a salt solution and depositing it with alcohol. The protein obtained in this manner is extremely poisonous to hay fever patients and 1/40 milligram suffices as a rule to produce a violent reaction upon the mucous membrane of hay fever patients. Of late the plan has been adopted to add 1 milligram of the poisonous protein to 2 cc. of water, of which 1 drop is applied to the mucous membrane of the eye or nose of a hay fever patient. This gives a fairly uniform starting point for comparative investigations, which will be detailed further on. It may be pointed out that protein has been produced from hyacinths and other plants, which had been held responsible for attacks by many hay fever patients. This protein has shown itself entirely inert on hay fever patients, so far as experimental applications have been made. The fact mentioned above, that of nearly one hundred plant varieties examined, with exception of the pollen of grasses, only the pollen of the lily of the valley contains an albuminous substance poisonous to hay fever patients is of the greater interest, as the lily of the valley belongs to the family of liliaceae. None of the pollen of other varieties of liliaceae examined yielded an active pollen toxin, neither did plants nearer related to the grasses than the lilies contain the active agent. Added interest is given to these observations by the fact that toxin of the pollen of the lily of the valley can be neutralized by the antitoxin obtained from the pollen of the grasses. These results seemed so remarkable that the doubt arose whether or not an inadvertent substitution for pollen of lily of the valley by pollen of the grasses had occurred. In order to arrive at unques-

tionable results, pollen of lilies of the valley were repeatedly collected under conditions excluding the possibility of substitution and assuring their purity and with like results. We are therefore confronted with the fact that the pollen of all the 20 or more varieties of grasses and the pollen of lilies of the valley contain an albuminous substance poisonous to hay fever patients of seemingly identical nature. The relation of the toxins to the antitoxins are of such a specific nature, as we know from bacteriological observations in other fields, that we may not merely count upon a chemical differentiation of the toxin of the pollen of the lily of the valley from the toxin contained in the pollen of the grasses. The attempts so far made to establish a differentiation by precipitation reaction have failed, because the graminial pollen antitoxin so far obtained does not produce a precipitate in the corresponding toxin solution.

After establishing the fact that the gramineae pollen contained the hay fever poison, experiments were at once set on foot to obtain a specific antitoxin, *i. e.*, a pollen antitoxin. It became evident that animals of the same kind differed remarkably in their resistance to the action of the hay fever poison. Some of the squirrels soon died after an injection of the poison with rapid loss of weight. Others did not seem to be appreciably affected by the same dose. Especially sensitive appeared to be a French lapin. Almost all of seven goats stood even large doses of pollen toxin with but slight reaction. One of the goats, however, fainted after each injection and finally died a few minutes after an injection. Antitoxic effects began to appear in the blood of some of the goats after injecting them for 4 months, and it did not appreciably increase in its activity by further injections.

Of 8 horses treated with pollen toxin some reacted but feebly to the toxin, others not at all. These were animals of common stock. One horse of blooded stock reacted so violently to the injection of a much smaller dose of pollen toxin than had been well borne by the goats, that for days it was doubtful if he would survive the injection. Several horses have since been found reacting to pollen toxin. These horses when injected with 1-4 grain of pollen granules or with the toxin derived from this amount of pollen grains began

soon after the subcutaneous injection to gap continually. They are frequently affected with severe fibrillary muscular contractions. After a few hours an urticaria-like eruption has repeatedly been observed covering the entire body of the animal. Soon thereafter a swelling at the point of injection appears attaining a diameter of 60 cm. in 24 hours receding in the course of a few days. The temperature of the animal runs up from 37.5 to 39° and 40° C. The susceptible horses lose appetite for a few days and appear with hanging heads severely sick. In the blood of susceptible horses antitoxic properties could be discovered after 4 weeks, 4 injections having been administered. If a drop of the above described toxin solution containing 1/40 milligram of the protein which produces severe reactive symptoms in hay fever patients, be mixed with a drop of the horse serum possessing antitoxic action it will be found that this mixture, when applied to the mucous membranes of hay fever patients is no longer productive of irritative reaction. In the course of a few months this antitoxic action increases to the extent that one drop of the antitoxic serum suffices to neutralize completely 20-25 drops of the toxin solution. Indications point to the fact that this antitoxic effect of horse serum may be still further increased. With this specifically acting horse serum it is possible to neutralize the pollen toxin in ratio as well as to subdue a reactive inflammation previously produced by the application of pollen toxin to mucous membranes of hay fever patients. Experiments, which have been made along this line in a considerable number of hay fever patients, confirmed without exception the observation that the disagreeable subjective symptoms of burning and itching and the excessive secretion of the lacrimal glands and the nose at once subside. It is naturally impossible to cause an immediate subsidence of the edema of the conjunctiva or of the nasal membranes by the application of the antitoxin. It shows, however, a marked effect in this direction and causes in 15-30 minutes the disappearance of the swelling, which otherwise usually lasts 24 to 48 hours. The application of antitoxin stops the irritation due to relatively large doses of pollen toxin promptly, which may, however, return at times after a variable length of time, even after a few days. In

these cases a second or third application of antitoxin is needed to neutralize the pollen toxin completely

The observation that larger doses of antitoxin are necessary to overcome already existing irritations, than are needed for immediate neutralization of the poison, applies to pollen-antitoxin equally with other antitoxins. This points to the therapeutic necessity, that the antitoxin should be used upon the appearance of the very first symptoms before the recurrence of edema, and preferably as a prophylactic measure. If a drop of pollentoxin be applied to the conjunctiva of a hay fever patient and the antitoxin be used as soon as the itching sets in, the installation of one drop of antitoxin suffices as a rule to prevent further symptoms of irritation. If the installation of antitoxin be however delayed until the appearance of neurosis it takes 3-4 or more drops to cause its subsidence. The results just detailed were made upon artificially produced hay fever in laboratory experimentation. The hay fever season having not yet arrived it was impossible to experiment upon hay fever patients suffering from hay fever produced in the natural way. Dr. Prausnitz had attacks of hay fever in Sicily and in the neighborhood of flowering grasses particularly of barley, especially while handling flowering grasses, and it was possible for him to control them by the use of the antitoxin prepared in the above manner. A subcutaneous injection of 1 c.c. of this antitoxin assured his entire freedom from attack during a day until evening in spite of the fact that he purposely handled an unusually large amount of flowering grasses. These attacks cannot be considered natural hay fever, as Dr. Prausnitz only suffered when he purposely exposed himself to flowering grasses, and only during the time of exposure. Natural hay fever occurs during the hay fever period anywhere in the open air. It is to be inferred that therapeutic measures will be of easier application and surer result than in the laboratory experiments or as in Dr. Prausnitz' experience, as much larger quantities of poison have been used in these instances, than can possibly be encountered under normal circumstances.*

*Since writing the above the conditions have changed in so far as the experience of early hay fever symptoms have been reported

The serum as might have been expected, was used entirely according to directions. A drop of serum was inserted into the eye and the expectation was entertained that asthmatic symptoms could thereby be at once removed. Oftentimes it was expected that a single application of serum would at once and forever cure the most aggravated attack of hay fever. The accompanying instructions seemingly remained frequently unread. On the other hand reports have been received indicating the use of the serum by physicians with extraordinary understanding of the subject. One physician, for instance, applied the serum in a very severe case of hay fever asthma, in 3-4 drop doses in each side of the nose, at first at intervals of 10 minutes, then in one-half and again in one hour. These applications caused all objective symptoms to subside promptly, and the objective symptoms receded too quickly, and resulted in a refreshing sleep after intense suffering in spite of the administration of the usual medication. A similar use of the serum by other physicians was followed by prompt and lasting subsidence of the attacks of coryza and swelling. The report of an officer, who usually suffers severely from hay fever, and whose duties compelled military maneuvers among flowering fields of cereals, shows he remained free of every sense of irritation if he instilled one drop of pollen toxin into each eye and each nostril before rising. He could remain 45 hours in the open air without annoyance. If he again applied serum to the locality where the first symptom of itching reappeared he remained altogether free. Other patients were compelled to use the serum more frequently. Without closely considering the numerous reports received from many places it can be stated as the main result of the observations at hand and in confirmation of my previous communications, that a careful prophylactic use of the serum or its use as soon as the first symptoms of irritation from hay fever poison appear, will bring about a surer result and with a smaller amount of

to me from many sources. As in the personal experience of the author, the first symptoms were an itching and burning of the conjunctiva. The application of one drop of antitoxin has, as the reports state, sufficed to regularly abate these symptoms. On June 5th many reports of flowering cereals and grasses were at hand.

serum, than when used after the establishment of a severe attack. It is necessary to admonish an economical use of the serum not only on account of the as yet necessarily high price thereof, but also because of the available supply of antitoxin for this year, is quite modest. Our expectations from the external use of the antitoxin were surpassed in some respects as the reports show. While the observations of Dr. Prausnitz on himself seemed to justify the expectation that the external application of the serum would prevent the appearance of a renewed attack for one-half to one hour, it was hardly to be expected that this freedom would extend to five hours. The question opened by this observation cannot be settled in a day, and it will take a careful critical review of all the communications received and to be received for some weeks to determine the exact dependence we may put in the therapeutic use of the antitoxin. The exact use of antitoxin in the therapeutics of hay fever asthma will be of extreme interest. It might be that a timely application to the conjunctival and nasal membranes will prevent the attack. Its use at the exact and proper time will for various reasons not be always possible, and the question arises how far the pollen toxin may be neutralized after its resorption, probably by subcutaneous injection or by resorption from applications to the nose. The case above recited seems to justify the hope. The use of antitoxin externally is preferable to the subcutaneous use, should it prove efficient in the control of asthma, for these reasons: The subcutaneous use of hay fever antitoxin is entirely inert so far as present experience goes, on normal human beings, while its subcutaneous use on hay fever subjects gives rise to quite disagreeable symptoms of irritation. An injection in the forearm produces frequently a swelling starting at the point of injection and spreading over the entire forearm accompanied by a feeling of heat, redness and disagreeable itching. These symptoms may last for six days. Repeated injections seem to a certain extent to produce immunity to these accompanying effects of the injection, which are however not observed in all hay fever patients. Should hay fever asthma be not controlled otherwise than by subcutaneous injection of the antitoxin, the subcutaneous use of the serum may be ad-

vised without great fear from the accompanying effects, which are far less disturbing than a severe attack of asthma. This question might in the end be left to the individual determination of the physician or patient, if he desires to use the serum subcutaneously against hay fever asthma or not. Its general use subcutaneously cannot, after what has been said, be at present advised. The local application of the serum to mucous membranes is not productive of amazing symptoms beyond a barely perceptible irritation due to the quantity of carbolic acid contained in the serum as preservative. It can be considered as a fortunate condition that the topical application of this particular serum, which in its subcutaneous use affects adversely mostly or altogether those to whom it might be of specific value is the simplest and probably in most cases quite efficient. It might also be reasonably expected that it will yet be possible to free the antitoxic serum of the products which are productive of the disagreeable accompanying symptoms. It was observed that the increasing efficiency of the antitoxin did not increase the intensity of the accompanying symptoms, but rather lessened them. It may be therefore concluded that the antitoxic action is in no relation to these symptoms and not depending on the product which causes their appearance, and that their removal will not detract from the efficiency of the serum. Until effective antitoxin was obtained it was the author's observation that an instillation of toxin into the conjunctiva sack or to the nose was quickly productive of severe palpitation and general malaise to the extent of prohibiting mental exertion. Since the use of the antitoxin in neutralizing the irritating attacks due to the effects of the toxin such systematic symptoms have been prevented. This observation gives rise to hopes, which report seem to justify, that the timely external use of the antitoxin will be able to prevent the appearance of asthma. The subcutaneous use of pollen antitoxin produced in hay fever patients symptoms of irritation in the eye, sneezing, swelling of the nasal mucous membrane and other symptoms of hay fever as well as severe asthma-like attacks. The symptoms produced by these subcutaneous injections of pollen toxin were so violent and threatening that a repetition of the experiments is not permissible. The symptoms produced in Dr. Prausnitz's ex-

perience were rather on the body surface. In the author's experience severe and threatening heart symptoms occurred after the subcutaneous application of the toxin. In normal persons no reaction was produced by the subcutaneous injection of pollen toxin. It is at present impossible to determine if there are not some which will show a certain amount of reaction toward the injection of pollen toxin. The above mentioned successful effort of Dr. Prausnitz to immunize himself against hay fever attacks by subcutaneous injection of antitoxin for an entire day, indicates to hay fever patients who are compelled to travel during the time they are affected or who, as doctors, have to perform important operations, or as officers who wish to remain available for duty, that by only prophylactic measures for a short period of time they can keep themselves in condition for work, without being compelled to make frequent use of the antitoxin externally. This short exemption of attacks will for the present have to be bought by frequently very disagreeable effects on the inoculated arm and must therefore be regarded as an exceptional measure, especially as it does not seem unlikely that the effects of the external application of the serum may last for one or more hours. The attainment of prolonged passive immunity of hay fever patients against hay fever attacks, or even better, the attainment of a method of inducing active immunity must be left to the future, though favorable indications in this direction are at hand.

In conclusion, a few words may be said concerning the individual predisposition to hay fever. The application of pollen toxin to conjunctival or nasal mucous membrane has made it possible, as mentioned before, to recognize hay fever patients by its production of violent irritation, which remains entirely absent in normal persons. It is unnecessary to point to the far-reaching importance of this observation. There are, as you know, still eminent physicians and epidemiologists who deny the existence of an individual predisposition both as to infectious diseases, as cholera, typhoid fever, diphtheria, etc., as well as to other similar and hurtful influences. In order to prove the fallacy of denying the existence of individual predispositions, experiments with hay fever antitoxin are hardly necessary, as observations in

sufficient number are at hand to prove the existence of an individual predisposition in cholera, diphtheria and other infectious diseases. It has, however, been heretofore impossible to approach this question experimentally. The discovery of hay fever antitoxin has made experiments on this line possible. The opinion has of late been largely held that hay fever was not a disease *sui generis*, but belonging to the class of nervous coryzas, from which it could not be distinguished, and that its attacks were prevalent in winter as well as in summer. These opinions are certainly erroneous. Several cases of nervous coryza have come under observation which showed so little reaction to the application of hay fever toxin as normal people. On the other hand, several persons were observed reacting to the application of pollen toxin who denied having hay fever but admitted having an affection which at any time of the year was productive of hay fever like attacks. One case of nervous asthma reacted to pollen toxin, but the patient stated that he did not suffer from hay fever in the summer. Finally, quite a positive reaction was observed in a patient with chronic conjunctivitis, who stated that he did not suffer with hay fever. The following experience will show the necessity for great care in these investigations. The instillation of pollen toxin into the eye of persons not affected with hay fever caused them to complain of a burning feeling in the corresponding eye. Objective changes such as are always present in hay fever patients, were entirely absent. Subsequent applications of physiological salt solution into the same eye of the same persons caused the same burning sensation. The application of salt solution or pollen toxin to the other eye were borne without any inconvenience whatever. In all cases it was the right eye which showed increased sensitiveness, and it happened to be persons who used their right eye constantly in microscopic work. This, therefore, was not an irritation due to a specific action of the pollen toxin, but a general hyperesthesia due to excessive use and of considerable clinical interest. It is inopportune to consider as yet the effect of pollen toxin on the interesting conditions occupying the state of transition between the normal person and the one affected with hay fever neither can we enter into the question, if the autumnal

catarrh of the United States does not depend upon entirely different causes, probably upon the pollen of other plants. The decision of these questions take much time. It is hardly necessary to enter into the consideration of localized obstructions of the upper air passages, especially of the nose, or of local excitation of the regions of mucous membrane supplied by the trigeminus as a cause for disposition in hay fever, when we consider that the excitant is a soluble poison, which is productive of irritation when applied to the rectal mucous membrane and even to the epidermis of hay fever patients. The cause of hay fever being a soluble poison suggest the thought that normal persons have the capacity to oxidize or in some way to destroy this toxin before its effects can become active, or it is possible that the normal person possesses active bodies capable of immediately neutralizing the poison. The following experiment does not give support to this view, which suggests itself readily enough. A solution of 1 mgr. of pollen toxin in 2 cc of blood serum of a normal person does not show, when applied to a hay fever subject, a partial or complete destruction of the toxin, but its action shows a greatly increased activity as compared with a watery solution. It follows, therefore, that normal human blood serum contains no bodies possessing the property of neutralizing the toxin. The possibility seemed to exist that the blood of hay fever patients contains substances which convert the pollen toxin into a poison, and make it active, analogous to the observation of snake poison by Ehrlich and his followers, but experiments to solve this question gave a negative answer to this supposition. Pollen toxin dissolved in the blood serum of hay fever patients does not become thereby active on normal persons. A former publication enters more fully into all questions of individual predisposition.* The fact of exemption from hay fever of savages and practically of the laboring classes in civilized countries, as well as other considerations, suggest that we must look upon hay fever as one of the consequences of higher civilization. The further fact that mental over exertion, grave infectious

*Cause and Specific Cure of Hay Fever. R. Oldenburg. Munich and Berlin.

diseases, especially la grippe, are productive of a hay fever diathesis leads us to the supposition that we must regard this diathesis as a permanent specific injury to the central nervous system. The hay fever diathesis seemingly does not depend upon gout or other constitutional anomalies. This hay fever diathesis seems closely allied to the idiosyncrasies shown by many people against strawberries, crayfish, honey and other substances. We are dealing with a congenital or acquired hypersensitiveness toward specific substances which cannot be explained as Behring does in diphtheria, by a defective elimination of free receptors. The report does not present a complete work. It has opened a view into a field of work which reaches beyond the special field of hay fever, far into the field of physiology, general pathology and epidermiology. To encourage work in this apparently fruitful field it is the hope of this communication.

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND
OTOLOGICAL SOCIETY. NINTH ANNUAL MEET-
ING, HELD IN LEXINGTON, KY., APRIL 30,
MAY 1 AND 2, 1903.

J. A. STUCKY, M. D., OF LEXINGTON, KY., PRESIDENT.

President's Address.

Dr. J. A. Stucky delivered this address. He said that the society had good reason to be proud of its rapid growth and great achievements in the few brief years of its existence. It had been organized on a broad foundation, and there should be no fence put up to prevent the entrance of those who were loyal to the code and had won their spurs. The existence of this society had shown the wisdom of following the broad principles laid down at its very inception, and at the present day its members recognized no east or west, no north or south, but one brotherhood and one purpose.

Folding Head Band.

Dr. S. MacCuen Smith, of Philadelphia, exhibited a folding head band, which was convenient, because of its great portability. It was not his own device.

New Instruments.

Dr. Chevalier Jackson, of Pittsburgh, exhibited a skiagraph of the skull; also his emergency thyrotomy canula, an instrument modeled after the ordinary medicine dropper, and used for checking hemorrhage. His turbinotomes were presented, and the statement was made that the operation was done very quickly and did not provoke either immediate or secondary hemorrhage. He made use of cocain and adrenalin before the operation, and a gauze packing for twenty-four hours after the operation. In about 5 per cent. of the cases it was necessary to pack again for twenty-four hours.

An adenoid curette with an attachment for preventing the

dropping down of a portion of the adenoid into the larynx was shown; also some chisels for mastoid operations, and an improved trephine.

A transillumination lamp was presented. It was intended to be operated by a 110 p. volt current without any reduction of the current. If left in the mouth more than a minute it would become uncomfortably hot, but this time was sufficient for the examination. He was disposed to think that much of the present skepticism regarding transillumination arose from the fact that miniature and very inefficient lamps had been commonly used. The intensity of the light could be easily modified as desired by the use of a rheostat.

Dr. J. M. Ray, of Louisville, said that mistakes were frequently made in examining the mouth, because of the difference in the intensity of the light used. With a very brilliant light, like the one just presented, it was probable that it would pass through an antrum, even though the latter were blocked with pus.

Dr. C. R. Holmes, of Cincinnati, thought the point had been well taken about the wrong conclusions likely to be drawn from the use of a light of too great intensity. While it was desirable to have an intense light, this should be capable of regulation at will.

Dr. C. G. Coakley, of New York, said that he had never tried transillumination in daylight with such intense illumination; nevertheless he firmly believed that the same amount of illumination could not be used in different persons. If the examination were made in a darkened room a lamp of two or three candle power would give sufficient illumination, although even with such a lamp it was important to have means for regulating the intensity of the light. With regard to the scissors, he would say that he had not found any scissors which would do the work as well as a snare. The scissors occupied much valuable space. For post-nasal work he would not like to use the ratchet instrument, as the sliding attachment would allow of more rapid operating. Some of these so-called hypertrophies were really edematous masses and could not be secured by a snare without an anesthetic. The operation with the snare must be done almost instantaneously, because of the attendant pain.

Dr. Wendell C. Phillips, of New York, said he had recently had some experience in this field. He liked the forceps exhibited for removing hypertrophied tissue, but the problem was somewhat different in connection with the inferior turbinate, for, in some instances at least, scissors would not take off the bone. He thought Dr. Jackson had underestimated the importance of secondary hemorrhage, especially when removing the posterior portion of the inferior turbinate bone. Personally he had had far less trouble in this respect since he had adopted the plan of giving the patient a mild solution of adrenalin, with instructions to spray the parts frequently with this solution, until after the time for secondary hemorrhage had gone by.

Dr. L. A. Coffin, of New York, could not understand how the scissors could be opened widely enough to allow of the removal of the turbinate *with one clip*, and at the same time get into the nostril. Like Dr. Coakley he preferred the use of the snare. Neither primary nor secondary hemorrhage after operation on the inferior turbinate should be looked upon lightly. For the last few months he had adopted the plan of applying the snare and then putting the patient in another room on his back. From time to time the instrument was given a slight turn, and in time the hypertrophy was removed without bleeding and without pain, except on the introduction of the instrument. After the removal of the snare he paid no attention to the portion removed, as it would take care of itself.

Dr. Jackson said that a large experience with his instruments made him feel sure that they were at least worthy of trial. He would positively dissent from the statement that it was possible with his brilliant lamp to fail to obtain a shadow indicating pus in the antrum. The turbinotomes were entered into the nostril while closed, and were then expanded.

Dr. F. C. Cobb, of Boston, said he did not think it was the pus that produced the shadow in an antral empyema, for he had found the shadow quite as dark after washing out the antrum as before. The shadow was produced by the thickening of the mucous membrane, resulting from edema and the polypoid degeneration of the membrane.

Foreign Body in Nose for Thirty Years.

Dr. W. L. Ballenger, of Chicago, presented a specimen removed from the nose. At the time it was supposed to be a rhinolith. The case was one of foul-smelling suppuration of the nose. According to the history, thirty years ago the patient's eye was destroyed by the explosion of a gun. On cutting open the mass removed from the nose it was found that the core of the foreign body was the breech-pin of a musket.

A Case of Lipoma of the Tonsil.

Dr. Clement F. Theisen, of Albany, reported this case. The patient was a girl or eight years, seen in December, 1902. She had suffered several years from a severe paroxysmal cough. Examination showed a smooth-surfaced yellow tumor about the size of a marble, which was attached to the centre of the right tonsil by a long, thin pedicle. Dr. George W. Blumer reported that the tumor was a lipoma. The speaker said that he had been able to find only six other cases of true lipoma of the tonsil on record. They were the rarest of the benign tumors of this part. It was rather remarkable that the majority of the cases had been found in adults, one being in a person ninety years old. As a clinical feature, the yellow color of the fatty tumor was important, though not pathognomic. Practically, the only way that a positive diagnosis could be made was by histologic examination. Removal of the growth by the hot or cold snare, or by the scissors, was the only treatment.

Retropharyngeal Abscess. Report of Three Cases.

Dr. L. C. Cline, of Indianapolis, presented this paper. He said that, from the fact that these abscesses were associated with or followed naso-faucial inflammation, it was reasonable to suppose that these abscesses were dependent upon infection in that way. The first case reported was that of a child of five and a half years, seen in consultation. She was greatly emaciated, had a temperature of 101°F. and suffered from attacks of dyspnea. The neck was greatly distended, especially on the right side, and there was a peculiar croaking cough. An incision was made and pus evacuated. She did

well for five days, when she suddenly had a choking attack, and was so near death that the attending physician did an emergency trachotomy. Subsequently better drainage was established and the child made a good recovery. The second case was that of a man with a troublesome spasmodic cough. There was a large swelling involving the whole of the posterior pharyngeal wall. A long and deep incision was made in the median line from below upward, but there was only a scanty discharge of pus and connective tissue. The patient was relieved, but continued in poor condition because of the general sepsis, and died in a choking fit two weeks later. The case was apparently of tuberculous origin. The third case was that of a child of two years and a half, seen in March, 1903. After recovering from measles the child developed a croupy condition and, for a few days before being seen by him, had had a peculiarly severe paroxysmal cough. There was a large swelling on the posterior wall of the pharynx, and this was freely incised and a large quantity of pus evacuated. Recovery was rapid.

Dr. C. G. Coakley commented upon the fact that these cases occurred for the most part in private practice. In the public clinic he frequently saw six or seven of these cases in the course of a winter. These abscesses seemed to originate in some infected lymphatic gland in this region, often as a result of tuberculosis. A bacteriologic examination was not of much importance, because of the many micro-organisms found in the throat. H. had seen but one case of retropharyngeal abscess in private practice, and that was in a man about thirty years of age. There was no enlargement of the tonsil or edema of the pillars of the fauces. Incision gave speedy relief. Sometimes these abscesses were secondary to caries of the cervical vertebrae. It was his rule to employ the incision through the mouth, beginning far down in the median line and carrying the incision as far as the swelling extended. The patient's head was then lowered and the finger used to press out the pus. Sometimes this opening closed, requiring a second or, perhaps, a third incision. Although he had operated several times upon patients almost moribund, he had had no serious complication arising from the passage of the fluid down into the air passages.

Dr. F. C. Cobb said that he had seen a good many of these abscesses at the Massachusetts General Hospital. It was always well to examine the cervical vertebrae. In young children it was his practice to make a broad incision and take pains to keep this incision open. Apparently the opening had partially closed in one of the cases reported in the paper. There seemed to be very little risk of suffocating the patient by the escape of pus.

Dr. S. MacCuen Smith, of Philadelphia, said he would like to know what provision Dr. Coakley made to prevent injury to the vessels of the neck.

Dr. Coakley said that he found the old-fashioned hatchet-shaped gum lancet a useful instrument for opening these abscesses. The abscess usually stood out quite prominently, and the blood vessels were displaced laterally, so that there must be comparatively little danger of injuring them by the incision of the abscess.

Dr. George L. Richards, of Fall River, thought these cases were more common than appeared from the records, and that children often died from this condition without its being diagnosticated. He recalled a case in which a child had been brought to his office almost asphyxiated. On passing in his finger he felt the abscess, and instantly he opened it with his finger nail, giving the child relief. Although an emergency method, it was justifiable sometimes in general practice as a life-saving measure. He did not think there was much danger of hemorrhage in operating upon these cases. In incising the abscess he made the incision both upward and downward, sometimes for fully two inches, to make sure that the whole extent of the abscess was laid open. With concentrated peroxid of hydrogen solution, on a cotton pledget, he then swabbed out the abscess cavity.

Dr. W. H. Dudley, of Easton, Pa., said that the second case mentioned in the paper recalled one that had once come to him, with a history of paralysis of one of the ocular muscles. The patient had been on antisyphilitic treatment, without benefit, and was in wretched condition at the time. Examination revealed a fluctuating tumor of the pharynx, and on incision of this complete and permanent relief was given.

Dr. J. H. Ray, of Louisville, had not found these abscesses particularly rare, especially in nursing infants. Sometimes these abscesses were traumatic, and they were usually situated very low down. In one such case the breast bone of a quail had lodged in the esophagus, and in the efforts to remove the bone the family physician produced considerable traumatism. Some days later the neck swelled, deglutition became almost impossible, and the patient had that peculiar croaking voice so characteristic of retropharyngeal abscess. The mirror showed a swelling down near the larynx. This was incised and considerable pus evacuated. In another traumatic case a pin had lodged in the larynx of a boy two days before. The pin was deeply buried in the tissues, and was removed with difficulty. A week later the child returned with a circumscribed swelling low down on the posterior wall of the pharynx, associated with much infiltration of the larynx,

Dr. Chevalier Jackson said that in opening these abscesses he made use of a bistoury or scalpel, the greater part of the blade of which was guarded by wrapping it with adhesive plaster.

Dr. Cline, in closing his discussion, said that the first case had lasted six weeks and general infection had already occurred, which probably explained the refilling of the abscess.

A Case of Tubercular Laryngeal Stenosis Treated by Tracheotomy.

Dr. Price Brown, of Toronto, reported this case. The patient was a man of thirty-one, who had been referred to him on April 2, 1901. He was suffering from night-sweats and a frequent racking cough. Tubercle bacilli were not found in the sputum at the time. The left side of the epiglottis was decidedly infiltrated, and the whole larynx was bathed in mucus. An alkaline spray was used daily, followed by menthol and lanolin, and at intervals of a few days an application of a 50 per cent. solution of lactic acid was made. By May 12 the patient had improved considerably, both in the local and general condition. On May 13 there was a chill and a rise of temperature to 103° F. The lungs showed fairly

advanced tuberculosis. The patient then began living outdoors in a tent. Eleven months later his condition had improved so much that he was admitted to a sanitarium for incipient tuberculosis, although he had been refused admission at the time of commencing the tent life. Nevertheless tubercle bacilli were found in the sputum. On November 10, 1902, the larynx became so edematous that he felt justified in doing tracheotomy, and high tracheotomy was performed. From the time of the operation the laryngeal symptoms slowly improved. For many weeks now the temperature had remained normal and the patient had regained his full normal weight. No tubercle bacilli were found at present in the sputum. The tube was still worn, and when the opening was closed with the finger the patient could speak in guttural tones. There were no visible ulcerations in the larynx. After another summer of tent life it was purposed to attempt the cure of the laryngeal stenosis by the use of graduated tubes.

Dr. John A. Thompson, of Cincinnati, thought tracheotomy was indicated in those comparatively rare cases of tubercular laryngitis, in which there was extensive infiltration with comparatively little trouble in the lungs. He had seen such a case first about eleven years ago. In that instance the dyspnea was extreme, and was due to the fixation of the cords by extensive infiltration. Under local treatment this infiltration was absorbed, and instead of dying within a month, as had been expected, she was still alive and hearty. The other side of the picture was the danger of infection of the other tissues of the neck by tuberculosis. This was exemplified by another case, in which low tracheotomy was done and a laryngofissure established. The latter healed readily, but the tracheotomy wound became infected by the sputum, and the tissues of the neck broke down very rapidly. The unknown element of vital resistance must always be an uncertain factor in determining whether or not tracheotomy was desirable.

Dr. C. F. Thiesen spoke of a case of laryngeal tuberculosis which had been complicated by a severe attack of grippe. This was followed by such severe dyspnea that immediate tracheotomy was demanded. The trachea was not found in

the usual position, but considerably to the left of the median line. On opening it several ounces of pus escaped from an abscess connected with the trachea low down. The man eventually died some weeks later of a septic pneumonia.

Dr. Price Brown closed the discussion. He said that the last speaker's remarks reminded him of a case of abscess of the larynx that he had seen at one time, and in which death occurred during the night. It was undoubtedly important to carefully select the cases.

The Pathology of Ethmoiditis Reconsidered.

Dr. Edward Woakes, of London, England, sent a communication on this subject, which was ordered read. The author stated that there was certainly a specific character to this disease. In the first stage morbid changes were found only in the mucous membrane. Sometimes some myxedematous tissue would be in evidence. The glands embedded in the newly formed fibrous tissue were not only compressed, but were often absorbed and assimilated. In the second stage the small arteries of the submucous stratum were invaded and coincidentally myxoma developed from within, and the bone itself became thinner by absorption. Later on sharp spicules of earthy matter projected from the surface, and by this time or perhaps long before the fibrosis itself tended to atrophy. The author then raised the question as to whether fibrosis was due to the pre-existence of a constitutional diathesis, and expressed the opinion that the answer would probably be found by future research in the field of the rhinologist.

The Import of the Salivary and Nasal Secretion in Hay Fever.

Dr. D. Braden Kyle, of Philadelphia, was the author of this paper. He said that he had first become interested in this subject eight years ago. There could be no doubt that with the variations of reaction from alkaline to acid, and *vice versa*, the secretion must undergo decided changes in its chemical composition. It was a well known physiological and therapeutic fact that certain drugs exerted a selective action upon certain parts of the body. He had become convinced

that by studying the saliva one could determine important changes in the chemical processes going on in the body. Hyperacidity was said to favor chemical change in the tissue with an increase in the proportion of organic acid. The chemical action of the saliva depended upon its ferments, the most important of which was ptyalin. A great many morbid processes had been traced to uric acid, but he believed that many equally important substances were deposited and eliminated. In this way might be explained many of the reflex neuroses, as for instance, hay fever. After a series of examination of the saliva of certain individuals afflicted with hay fever, and of those not so afflicted, he had become convinced that the irritation often arose from a chemical change in the saliva. There was apparently a field for investigation in this direction. He had known a teaspoonful of common salt, swallowed at one dose, to cut short more than one attack of hay fever, thus showing the relation between the chemistry of the secretions and such irritative conditions. Hay fever rarely, if ever, manifested itself in atrophic rhinitis, a condition which involved the mucous secretions. Certain attacks of so-called hay fever often came on suddenly, without apparent exposure to cold or other common source of irritation. In such cases he believed that, owing to some alteration in the chemical composition of the saliva, substances were formed, which, on exposure to the air, became decomposed and gave rise to irritants. Such an attack was comparable to the condition resulting in some individuals from the inhalation of ammonia. Normally, the sulphocyanides and ammonia salts in the saliva were present in about equal proportions, whereas in many of these cases these compounds had been found to be in excess. In cases of hyperacidity the sulphocyanides were in greater proportion than the ammonia salts, and the secretion was less irritating; in cases of diminished acidity the reverse was true.

Dr. Norval H. Pierce, of Chicago, said that there seemed to be a law governing infections, which was operative in all cases. A change took place in the body prior to infection with the microorganism. In Pasteur's well known experiments with chickens certain microorganisms of a certain virulence were introduced into the throats of chickens, and the latter

were kept at a certain temperature. Almost without exception, when the temperature sunk below a certain point and remained so for some time, active inflammatory changes supervened. Pasteur explained these phenomena by saying that the cold produced in the cells of the chickens a change, which permitted the microorganisms to become active. We were all frequently exposed to infection by various microorganisms and yet it was only exceptionally that we did actually become infected. Too little attention had been paid heretofore to the chemical changes occurring in the secretions. In the common rhinitis, in which the body was subjected to a chill, the chemistry of the secretions was altered, and, as a result, certain substances were formed, which were irritants to the mucous membrane. He believed the time would come when one would be enabled to demonstrate that heat and light themselves might produce such changes as were represented by the condition known as hyperesthetic rhinorrhea. He had a patient under observation who would escape from an attack of hay fever at a certain time of the year so long as he wore dark glasses, but on removing them the attack would occur, and would continue for some time, even though the glasses were replaced. When an ear drum was perforated the original infections played a secondary part as compared with the germs of putrefaction which were introduced through the external auditory canal. The secretions which were the result of the inflammation were decomposed by these putrefactive organisms, which cast off a chemical irritant. The latter in turn reacted on the mucous membrane, and a vicious circle was established. He recalled a case of a gentleman, who had accidentally discovered that if he took two drachms of phosphate of soda after an excess in eating or drinking this would entirely prevent an annoying pharyngitis which would otherwise supervene. In another case the taking of bicarbonate of soda into the stomach would bring a rhinitis to a close.

Dr. H. Holbrook Curtis, of New York, said that the theory presented in the paper only seemed to explain a certain class of cases. He had collected about 8,000 replies to his circular regarding hay fever and, while he had not tabulated and classified these, he was disposed to believe that hay fever

could be divided into three classes, viz: (1) A systemic condition, which might give rise to the winter variety of hay fever, e. g., explosions of uric acid in the blood or the chemical changes described in Dr. Kyle's paper; (2) a local condition in which the application of certain pollens or effluvia precipitated an attack of hay fever, and (3) a neurotic condition. It had been proved that a person who had hay fever, so called, did not have it if a horse had been thoroughly smeared with vaseline. It had been also proved that the irritant was an emanation from the body of the horse, either dandruff or perspiration. The elephant house of the menagerie was the cause of an acute hay fever in some individuals, while some experienced an attack from the inhalation of any dust. In one case of this kind he had effected a complete cure by removing a posterior hypertrophy of the turbinate.

Dr. C. F. Theisen referred to the very recent investigations of Dr. Dunbar of Hamburg. Dr. Kyle's theory, no doubt, accounted for many cases of hay fever, but he did not see how it would explain the experiments of Dr. Dunbar. This investigator's laboratory experiments in this field had extended over a number of years, and he had found that from various grains, particularly maize, were obtained a pollen poison which, when introduced into the nostrils of hay fever patients, would result in a typical attack of hay fever, even in winter. Again, by inoculating animals he had obtained an antitoxin which would absolutely neutralize his pollen toxin. Further than this, the pollen toxin was introduced into the noses of a number of persons who had never had hay fever, and the result was negative. We should distinguish between typical hay fever and that designated by the Germans as *rhinitis nervosa*.

Dr. Coakley said he had been deeply interested in the paper. Many of the statements made therein tended to confirm the results obtained by Dunbar. This gentleman found that in the interior of the small granules of pollen was a starchy body which was soluble in salt solution and blood serum, and when this was injected it gave rise to hay fever. However, on reading Dr. Dunbar's paper, he had been disappointed with the therapeutic results thus far obtained. In atrophic rhinitis the condition was such that there was very

little secretion and, hence, very little opportunity for the pollen to be dissolved; consequently, there was not much opportunity for absorption.

Dr. Price Brown said that he knew a gentleman who had suffered for years from hay fever, and had not been benefited much by any treatment. The speaker had advised him, last summer, to go to the country and work vigorously during the whole of the hay fever season. He lost his appetite, but suffered from thirst. The thirst he quenched by drinking lemons. He wholly escaped hay fever that time, and this, Dr. Brown thought, would be explained on the theory of chemical changes in the secretions.

Dr. S. MacCuen Smith said that it had been a tradition in his locality that hay fever could be relieved by taking a teaspoonful of table salt in one or two pints of hot water on retiring. This would not cure all cases of hay fever, but it would certainly abort many of them.

Dr. J. A. Stucky said that he had previously pointed out, in a paper on lithemic nasopharyngitis, that these neuroses were often due to intestinal intoxication, and that, as a result of a series of urinary examinations, he had found that there was an excess of indican in these cases. Continuing this investigation, he had since found an excess of indican present in 11 out of 17 cases. Another matter of interest was that it was exceedingly rare, indeed, to find hay fever in the laboring classes. In an experience of twenty-two years he had only seen it once, and that in a negro cook, who was cured of his hay fever by sending him out to work on a farm.

Dr. Kyle, in closing the discussion, said that he had not stated that all cases of hay fever were dependent upon change in the secretions. The case of hay fever brought on by leaving off the glasses, was evidently one in which there was some refractive error or the glasses would not have been worn; and, again, if lacrimation resulted from leaving off the glasses it was easy to understand how nasal irritation might result. He knew of a whole family who were exceedingly sensitive to the fumes of ammonia, and who could not on that account go near a horse without getting an attack of fever. These persons suffered from the inhalation of aromatic spirits of ammonia.

A Case of Bilateral Abscess of the Septum with Well-Marked Symptoms of Septicemia.

Dr. W. L. Culbert, of New York, reported this case: The patient was a man of thirty-one, a cigarette smoker, and a moderate drinker. Five days previous to coming under observation he had contracted a severe "cold." His temperature was 104° F., and his pulse 132, and the skin was clammy. There was intense throbbing pain; the nose was completely occluded; the mucous membrane was loose and there was a boggy and fluctuating tumor. Both abscesses were opened by a vertical and horizontal incision, and the relief was immediate. The cavities were irrigated first with peroxid of hydrogen and then with weak carbolic acid solution, and were then lightly packed. By the next day all of the septic symptoms had disappeared. Five days later the septum appeared normal. The patient brought with him a quadrangular piece of necrosed bone that had been discharged from the nose. The occurrence of septicemia in such a case was not usual, and the etiology of these abscesses was somewhat obscure. The fact that the abscess was bilateral and involved both the cartilaginous and bony septum was also of interest.

A Case of Epiglottic Abscess with Secondary Involvement of the Cervical Glands.

Dr. Culbert also reported this case. The patient was a merchant, 34 years of age, who had consulted him last summer because of painful and difficult deglutition and a sense of swelling in the throat. He was undoubtedly gouty, and had suffered previously from several attacks of quinsy. The anterior chain of lymphatic glands of the neck was swollen and tender. His temperature was 100° F., and pulse 90. The mirror showed a mass at the base of the anterior surface of the epiglottis a little to the left of the median line. There was no tumor or involvement of the larynx. The abscess was opened by the use of a sharp, curved aneurism needle. Relief was immediate, and the enlargement of the lymphatic glands disappeared in a few days. The extensive involvement of those glands was a point of some interest,

Dr. George L. Richards said that last winter he had first

seen a case of abscess of the septum associated with septicaemia. The patient was a physician whose nose had been injured by the break-down of his carriage. An abscess of the septum developed in three or four days, and it was incised by another physician. The man then developed a temperature of 103° F. and simultaneously a pain in one knee. The condition grew worse in spite of washing out the wound. Finally, Dr. Maurice H. Richardson operated, opening up several small abscesses. It was several months before the patient was able to resume his work. Some of these cases of septal abscess led to considerable deformity of the bridge of the nose.

Dr. C. Coakley said that the tendency of the cartilage to break down was very great, and took place quite rapidly. He thought it possible that the piece of bone discharged in Dr. Culbert's case was a part of the anterior portion of the ethmoid. He had advocated the use of the Simpson tampon to hold the parts in proper position and to prevent deformity.

Dr. W. L. Ballenger, of Chicago, said that the significant fact about the case of septal abscess under discussion was the amount of septicaemia, which seemed to indicate that there had been an extension of the infection beyond the septal part of the cartilage to a part more richly supplied with lymphatics. In his own published case there was bilateral abscess, but there were no marked symptoms of sepsis.

Dr. Culbert closed the discussion. He said that he had been unable to see the patient recently to determine whether or not there was much deformity. He had incised both sides of the septum largely with the idea of avoiding deformity.

The Relations of the Upper Air Passages to Diseases of the Gastro-Intestinal Tract.

Dr. L. A. Coffin, of New York, read this paper. He said that he had been struck by the large number of his clinic patients who complained only of post-nasal catarrh. The disease *per se* was a local one. The stoppage of the nose at night on the side next the pillow was a common complaint, and was due to hypertrophy of the posterior ends of the inferior turbinate. The pathology was that of a cirrhotic

membrane. The commonest basic principle in the etiology was irritation, and this resulted in hyperemia. The circumscribed area affected was against the view that the condition was the result of general toxemia. As the anterior nares frequently escaped the disease altogether, it was evident that one must look elsewhere than to the inspired air. Children, who seldom had great structural deformity of the nose, were quite as frequently affected with post-nasal catarrh as were adults. The author believed the chief cause of the pathological condition under discussion was the irritation resulting from the eructations of gases from the stomach. He believed that, in considering chronic follicular pharyngitis and nasopharyngitis as frequently secondary to chronic indigestion, one took a logical position, and that better results would follow from treatment founded upon this assumption. Hyperacidity was a most common cause, and the reason it was overlooked was that the great majority of these persons gave no symptoms pointing to gastric disorder. A series of cases had been examined by modern methods for stomach disorder, and the results noted and compared with the examinations made of the upper air passages.

Dr. Joseph A. White, of Richmond, said that, while he had been deeply interested in the paper, he did not feel fully convinced by the author's statements and reasoning. When a medical student, he had been taught that all troubles of the nose, pharynx, larynx and tonsils were invariably dependent upon disorders of the digestive apparatus and especially of the liver. The digestive apparatus was subsequently relieved of some of this onus by the theory that rheumatism was the basis of many of these affections of the upper air passages, and then, in turn, disorders in women, and smoking and drinking in men were also held to be etiological factors. Mere refrigeration was, as a rule, nothing more than a defective circulation of the skin, although perhaps dependent upon digestive disorder. The same was true of many of these other affections, because they were dependent upon circulatory disturbances of the same general nature. The old teaching was to give a calomel or saline purge, followed by the local or internal use of chlorate of potash, and many physicians maintain that this is good therapeutics to-day.

Dr. W. L. Ballenger said that, so far, there did not seem to be any exact evidence as to the relationship between the upper air passages and the disorders of the digestive tract, most of the literature on this topic presenting assertions rather than arguments. The nasopharynx was a region richly supplied with lymphoid tissue, and the region was, embryologically speaking, quite complex. Such tissue was of comparatively low vitality and, hence, more liable to inflammatory disturbances. This was probably one biologic factor in the consideration of nasopharyngeal catarrh. The lymphoid tissue of children was specially prone to inflammation on slight irritation, and, hence, it did not follow that the frequency of post-nasal catarrh in children was due to eructation of gases of the stomach and the regurgitation of irritating fluids.

Dr. F. C. Cobb asked if these cases had been followed, and whether the catarrh had improved as the condition of the stomach had improved.

Dr. S. MacCuen Smith said that the paper was very important and emphasized the statement made in the President's address concerning the necessity of a physician having a good knowledge of general medicine before taking up a specialty. So-called "bilious spells" were often associated with coryza and hoarseness and more or less pain, and the patient at the same time became weak from intestinal intoxication, dependent upon absence of the bile. These cases would improve wonderfully if one gave one-tenth of a grain of calomel every half hour for about ten doses, and followed this the next morning by a saline. After this he was accustomed to give half a grain to one grain of mercury and chalk every night for some weeks; it could be kept up even for months without any cumulative effect from the mercury. Many cases of dry throat would improve wonderfully from giving hydrochloric acid twenty minutes after a meal instead of immediately after the meal. In persons suffering from frequently repeated attacks of coryza the underlying condition was often an intestinal intoxication. His injections into the colon of lukewarm normal salt solution often proved beneficial.

Dr. J. A. Thompson said that he had seen cases of marked laryngitis which had proved absolutely rebellious to treat-

ment until hyperacidity of the stomach had been diagnosed and properly treated. Clinical experience was the court of last resort in medicine, and we should, therefore, give such experience its full weight. The regurgitation of irritating secretion during sleep was often responsible for pharyngitis and rhinitis. A little over one year ago a patient had come to him with a superficial ulceration on the tonsil which did not resemble either syphilis or tuberculosis. The case was on his hands for months; at one time healing and at another breaking down. The conclusion was finally reached that the recurrence of the ulceration was due to the stomach, and a chemical examination showed complete absence of hydrochloric acid in the gastric juice. When this acid was prescribed internally, the ulceration was speedily and permanently healed. He believed that if in obstinate cases of local inflammation the stomach were more carefully interrogated the key to the trouble would be discovered.

Dr. Lewis C. Cline felt that if this line of investigation were pursued more generally, there would be much less of the saw and cautery. The time had come when careful study of the secretions and better general treatment were demanded.

Dr. Price Brown thought that a great deal of this nasopharyngeal trouble was respiratory in origin. If one made sure that the nasopharynx was free from hypertrophied tissue, little else would be demanded, except some attention to the general health. The reader of the paper had spoken of otitis media as frequently resulting from the vomiting of children. While this might be so in many cases, in many others it was due to the presence of adenoid tissue.

Dr. L. A. McClelland, of Brooklyn, said that he had often noticed that cases of acute and chronic pharyngitis would improve very rapidly under large doses of calomel and jalap followed by salines, and that under this treatment very little local treatment of the nasopharynx was called for.

Dr. Dunbar Roy, of Atlanta, said that it was in the nasopharynx, particularly, that he understood the author of the paper maintained that digestive disorders exerted their influence. Undoubtedly nasopharyngeal catarrh was often the result of stomach disorder, but he had met with cases of nasopharyngeal bursitis again and again as a distinct entity.

The nasopharyngeal catarrh having this foundation, could be relieved in most instances, but nothing more could be accomplished. Persons, who were chronic drinkers, were well known to suffer from chronic nasopharyngitis as well as a catarrhal condition of the stomach. In such cases no other treatment was required, but a withdrawal of the stimulant.

Dr. C. G. Coakley said that if Dr. Coffin had done nothing more than call attention to the fact that some other part of the body required treatment besides the upper air passages, he would have given the members of the society a good deal to think about. It had occurred to him that many of the affections of the nasopharynx associated with digestive disorder were not necessarily produced by the gaseous eructation or by the regurgitation of irritating fluids. In his opinion, altered secretions were more directly responsible for the conditions under discussion.

Dr. Wendell C. Phillips, of New York, said he quite agreed with the last remark of Dr. Coakley regarding the effect of eructations, either in infancy or in later life. It was now well known that suppuration of the middle ear was always due to the introduction of septic material into the Eustachian tube; hence the case reported in the paper did not prove that eructations were responsible for the otitis. He would recommend that calomel and a saline should be administered coincidentally, that is, give half a drachm of bicarbonate of soda every half hour or hour for several hours, and at the same time give the calomel in doses larger than one-tenth of a grain. At the present time he gave half a grain of calomel every hour, until two or three grains had been administered, and at the same time gave large doses of the bicarbonate of soda.

Dr. J. A. White said that while he thoroughly appreciated the paper, it unfortunately dealt with a subject which could not be presented with scientific exactitude. He would like to know why the author excluded the consideration of the possible bad effect upon the stomach of the swallowing of the irritating secretions from the nasopharynx, when he was at the same time contending that the irritation from the stomach caused so much mischief in the nasopharynx. Personally he was disposed to think that gastro-intestinal trouble arose

from the condition of the upper air passages, and not that the reverse was true.

Dr. C. F. Thiesen emphasized the need for great general knowledge among specialists, quoting Virchow's comparison of the specialties to the offshoots of a tree, the trunk being general medicine.

Dr. Coffin closed the discussion. He said that he had endeavored to eliminate toxemia from the paper, and hence the throat, which was benefited by the administration of calomel, was not the kind of throat that he was trying to describe. The subject though old did not seem to him to have attracted the attention that it merited. In reply to Dr. Cobb's very pertinent question as to the ultimate results, he would say that the cases sent to the stomach specialist had been selected, because there was a practically normal structural condition of the nose and throat. He was particularly interested in the remarks made by Dr. Thompson concerning the cases of diminished acidity, for he had not been able to gather sufficient evidence about these cases.

SECOND DAY.—FRIDAY, MAY 1ST.

Symposium.—Otitis Media Suppurativa.

Dr. Norval H. Pierce, of Chicago, opened this symposium with a paper on the Etiology and Pathology. He said that whether the type were catarrhal or suppurative, pathogenic micro-organisms played an important part. The micro-organisms most commonly met with were the streptococcus, the staphylococcus and the diplococcus pneumoniae. Pure infection was the exception rather than the rule; the staphylococcus pyogenes was the organism most often found in pure culture. It was said that infection might reach the ear through the *fissura petrosa squamosa*. The same organism under different circumstances might give rise to different types of inflammation depending upon the virulence of the organism and their number, the resistance of the tissues and the rapidity of invasion. In considering the pathology one should remember that the mucous membrane of the ear served the double purpose of mucous membrane and periosteum, that the glandular element was scanty as compared with

mucous membrane elsewhere in the body, and that the mucus was largely liberated by the pavement epithelium. This explained the tendency of inflammation of this to result in necrosis, there being a rapid multiplication of white cells, thus impairing the nutrition of the bone, derived from the muco-periosteum.

Etiology, Symptomatology and Pathology of Otitis Media Suppurativa Chronica.

Dr. Charles W. Richardson, of Washington, D. C., presented this paper. He said that the most frequent causes of the chronic variety were: (1) Improper treatment of the first stage; (2) certain types of constitutional invasion, such as scrofula, tuberculosis, syphilis, anemia and marasmus; (3) the occurrence of an acute suppurative otitis in the invasion of certain acute infectious diseases; (4) differences in the virulence of the bacilli present; (5) local changes excited at the time of invasion or during the progress of the case, e. g., the development of granulation tissue, caries of the ossicles or tympanic wall and retention of the discharge, and (6) local changes in nasal and nasopharyngeal cavities. Caries, with necrosis of the ossicles, was the most common bone lesion in this disease. The stapes was rarely affected. The carious process might extend to the walls of the tympanic cavity, especially that portion formed by the auditory plate of the temporal bone. The membrane was almost always destroyed to a greater or less extent. The mucous membrane of the Eustachian tube, like that of the tympanic cavity, became infiltrated. The changes in the mastoid during chronic suppuration were: (1) Congestion, swelling and polypoid degeneration of the lining of the antrum and mastoid cells, (2) complete obliteration of the mastoid cells; (3) osteosclerosis of the mastoid; (4) accumulation of mucopurulent or purulent secretion in the antrum and mastoid cells, and (5) the formation of cholesteatoma. The most characteristic symptom of chronic suppuration of the middle ear was the presence of a discharge. Pain was infrequent in this variety, though it might result from interference with free escape of pus. There was often a feeling of pressure or headache. Subjective noises were occasionally present, but were seldom

continuous. Patients frequently heard fairly well so long as there was a free discharge, and they frequently became quite deaf when the discharge became scanty or ceased altogether. One perforation of the drum membrane was the rule, although occasionally multiple perforations were seen. The membrane might be dull white or yellowish red. The border of the perforation was usually more highly colored than the rest of the membrane. The periphery of the perforation might be adherent at one or more points to the tympanic wall. Granulations or polypi sometimes developed upon the tympanic wall. When the discharge was so limited as to form hard blackish crusts, due care should be exercised in the removal of the crusts, as their base might bleed and obscure the view.

The Inefficiency of the Wilde's Incision.

Dr. J. M. Ray, of Louisville, read this paper. Citations were made from various authors to show the revulsion against the use of the Wilde's incision, because of its inefficiency in the great majority of cases, and this fact was emphasized, because, as the author said, many of these cases were operated upon by general practitioners or general surgeons, who were not aware of the change of opinion that had taken place among otologists regarding this procedure. Any operation which did not open up a communication with the middle ear and give free exit to the pus, was an unsurgical procedure. The prolonged use of hot applications often resulted in an external otitis or masked the symptoms and led to an operation in cases in which no surgical interference was necessary. The large majority of cases of acute suppuration in children were treated by the so-called internal Wilde's incision, but the fact could not be too strongly emphasized that the antrum was involved in almost every case of acute suppuration of the middle ear. The opening up of the one cell communicating with the tympanic cavity was absolutely necessary.

Treatment of the Complications of Otitis Media Suppurativa.

Dr. James F. McKernon, of New York, read this paper. He

said that in aural surgery, as in other departments of surgery, success depended very largely upon the employment of asepsis. A careful examination of the nose and nasopharynx should be made and any obstructions present removed. For the lesions found in the drum membrane, the cardinal principle was to maintain cleanliness of the parts and apply an astringent solution, such as nitrate of silver solution in varying strength, following this by insufflation of powders. Still later catheterization and vaporization of the Eustachian tube were useful in adults, whereas in children the Politzer bag should be used. It was found very useful to temporarily close the opening in the drum by means of collodion or a bit of thin paper held in place by vaseline. Thickened and edematous mucous membrane could be reduced by the use of warm saline solution or the application of astringents. If the mastoid were diseased, the radical Schwartze-Stacke operation should be done. It was rarely necessary to remove the stapes, and care should be taken not to disturb its relations to the oval window. The incus was the ossicle which was usually first attacked, because of its limited blood supply. After the removal of the ossicles the tympanic wall and vault should be carefully curetted, so as to remove all diseased tissue, particularly around the orifice of the Eustachian tube. This having been done, the cavity should be wiped dry and packed with a wick of iodoform gauze. The latter should be removed after twenty-four hours, and then the parts manipulated thereafter as little as possible. Diffuse external otitis frequently occurred in the course of an inflammation of the middle ear. Free incision followed by curettage and drainage would give relief more quickly than palliative treatment. This condition was prone to occur in groups rather than singly, and repeated incisions were sometimes required. When there was tenderness over the mastoid an ice coil should be used for twenty-four hours, and the auditory canal should be irrigated with warm bichlorid solution of a strength of 1 to 8,000. If at the end of twenty-four hours there was no diminution in mastoid tenderness, the ice coil should not be persisted in; but if the tenderness had diminished, it was justifiable to continue the ice coil for twelve hours more. Sometimes the application of dry heat answered the same

purpose, but neither cold nor heat should be applied to the mastoid if the case were of several days' standing, or if edema were already present. If it became necessary to do the radical mastoid operation, it should be remembered that a softening of the bone at the root of the zygoma often demanded attention. If any areas of the dura were exposed, they should be separated by packing, to guard against the possibility of subsequent infection. To make the primary dressing comfortable to the patient and easy of removal, a piece of sterile rubber tissue, button-holed in places, should be first introduced, and then the gauze dressing over this rubber tissue. Ordinarily the first dressing should not be removed for five or six days.

Subperiosteal Abscess.

This was often met with in neglected cases in children and occasionally also in adults. Not only should the abscess be evacuated, but the mastoid process should be opened up.

Adenitis.

Adenitis occurred very frequently following suppuration of the middle ear. It was often relieved by hot applications or the use of some such ointment as the ammoniated mercury. If the glands appeared to be breaking down, they should be removed under anesthesia.

Pachymeningitis.

Pachymeningitis was the most common among the intracranial affections arising in chronic middle ear suppuration and usually accompanied mastoiditis, sinus thrombosis or brain abscess.

Epidural Abscess.

In cases of epidural abscess, a piece of gauze should be placed over the dura at operation, and removed on the third or fourth day.

Sinus Thrombosis.

The lateral or sigmoid sinus was most frequently affected in connection with pachymeningitis around the sinus. Each

individual case was a law unto itself. There must be complete and thorough exposure of the sinus, followed by flushing of the field with alcohol before opening the vessel. The part usually opened was that above the bend, the anterior wall being incised with the scalpel. The use of the aspirating needle had been discarded, because it often gave a wrong impression of the condition existing within. If a large clot were present, it should be removed with the curette and the hemorrhage allowed to continue for a few seconds to remove septic material. The hemorrhage was then controlled by a packing or gauze. In about one-half of the uncomplicated cases the circulation could be restored at the bulb. If much time were consumed in efforts to restore the circulation, it was better to desist. If the sinus did not contain pus, and there was no evidence of jugular involvement, the operative field should be cleansed and the sinus packed at the bulb without making further efforts to restore the circulation. The lower end of the sinus at the bulb should be exposed.

Thrombosis of Internal Jugular Vein.

If, on opening the sinus, there was a discoverable clot, the vein should be resected, and the same should be done if other veins were found to be similarly affected. The pneumogastric nerve should be carefully separated from the vessel. The wound in the neck should be sutured to within a small distance of the bulb and a wick drain inserted for the first forty-eight hours. It should be remembered that time was necessary to overcome the general infection, even though the source of this infection had been eradicated. The inferior petrosal sinus was frequently thrombosed in connection with the bulbous portion of the sigmoid sinus. A thrombosis of the cavernous sinus was almost invariably fatal.

Brain Abscess.

About 57 per cent. of all cases of brain abscess were otitic in origin. The most common site for subdural communication of pus was the inferior and posterior portion of the temporosphenoidal lobe. The roof of the mastoid antrum and the floor of the middle fossa were removed. A sufficient exposure of the dura was essential, and all bleeding points

should be controlled. When there was a collection of pus just below the dura the latter should be incised sufficiently for exploration, care being taken not to cut any large dural vessel. A silk suture should be passed through each flap for the purposes of retraction. An aspirating needle of large size could be used for exploration of the brain. When pus was found a sufficiently large opening was made to admit of the removal of the pus. The cavity could be cleansed by gentle irrigation with warm saline solution or by gentle mopping with ganze. The less the manipulation and the more rapid the operation the better the chances of success. Drainage could be secured by tubes or gauze wicks. The latter he preferred, using a wick covered with equal parts of a powder of boric acid and iodoform. When it was desired to explore the temporosphenoidal region, first the bone should be removed at a point one inch and a half above, and the same distance behind, the bony meatus. In all cases in which the pus was not definitely localized before operation, it was best to make use of the flap operation devised by Dr. E. B. Dench. The skull should be entered rapidly by the trephine or chisel, a free opening being secured. The utmost care should be exercised in searching for multiple abscess cavities. The principal point to bear in mind was that the skull should be entered at a point as nearly as possible to the floor of the lobe to be explored in order to secure free drainage. Another point was to limit the injury of the dura as closely as possible. The cerebellar lobe could be opened in the same manner as described in other regions of the brain; ordinarily the opening should be made at a point one inch and a half behind the bony meatus and one-third of an inch below this level.

Meningitis.

When meningitis was present, and it could not be localized, little could be gained by a surgical procedure. An ice cap should be applied and large doses of iodide of potassium given internally. A meningeal complication was almost always fatal. Leptomeningitis was almost invariably fatal yet it would seem rational, when exercised early, to explore and drain the region. Metastatic abscesses in different parts

of the body should be treated according to general surgical principles. Metastases of the intestinal tract should be treated by the internal administration of large doses of bichloride of mercury. He had seen this treatment successfully employed in several cases.

Facial Paralysis.

Facial paralysis following middle ear suppuration was not uncommon. The pressure should be removed by incision and warm irrigation, the patient being kept completely at rest, on a fluid diet and subjected to purgation. The use of the interrupted galvanic current would hasten the restoration of function of the nerve. When paralysis occurred several days after an operation for the removal of dead bone, it could be explained either by concussion at the time of operation and inflammation existing later, or by destruction of the facial branch of the chorda tympani. When the paralysis occurred immediately after an operation on the middle ear the presumption was that the nerve had been severed, and one should not expect rapid restoration of function. Of course, if the divided nerve could be found, it should be repaired by suture.

Labyrinthian Affections.

The surgical part of the treatment of labyrinthian affections should consist in the removal of all pressure. The local treatment consisted in placing the patient in bed and administering pilocarpin hypodermically in full doses for a week or more. If the patient could not be kept in bed the drug should be given by mouth. Potassium bromide should be given in full doses for the relief of the very annoying subjective signs. The upper respiratory tract should receive attention if needed. If both sides were affected, very little benefit would follow any method of treatment. He had met with little if any success from the vibratory treatment in such cases.

Cholesteatomata.

The treatment of cholesteatomata consisted in the entire removal of the mass. The safest method was to do a typical

Stacke operation, which allowed of the complete removal of the disease.

The Technique of the Radical Operation for Otitis Media Suppurativa Chronica.

Dr. Edward D. Dench, of New York, was the author of this paper. He said that it was imperative to shave the head for three inches around the ear. Women objected strongly to this, but it should be done nevertheless. The field of operation should be sterilized in the ordinary way, and an antiseptic dressing applied until the time of operation. The initial incision began one-quarter of an inch behind the insertion of the lobule and run upward and backward in a curved line, and was then carried upward and backward behind the line of auricular attachment to a point just above the apex of the auricle. It was then carried forward and downward. The incision must extend well forward in a horizontal direction in order to make a complete exposure of the upper portion of the bony canal, and thoroughly remove the outer wall of the tympanic vault. The anterior flap should be pushed forward so as to expose the posterior and inferior margins of the bony meatus. With a narrow blunt dissector, the fibrocartilaginous canal was then carefully dissected out. Ordinarily the fibrous meatus could be preserved for one-eighth or one-third of an inch. The surgeon should then enter the mastoid antrum. When it lay deeply, and this was usually the case, the funnel-shaped opening should be enlarged by removing the cortex from below and even by invading the posterior portion of the bony canal. This allowed of better inspection of the apex of the canal. It was incised to broaden the funnel above. When the probe entered the antrum and passed through the cell into the tympanic vault one could judge of the size of the antrum. The opening in the antrum should then be enlarged with the gouge so that the inner wall could be seen. The fibrous meatus should then be divided posteriorly close to the tympanic ring. A strip of sterile gauze should be inserted through the meatus and brought out through the incision in the posterior portion of the canal, and the two ends tied together and used as a retractor. This would pull the

funnel-shaped external meatus and detach the auricle well forward. The next step was to break down this partition between the mastoid antrum and the external auditory meatus. This was best done by chiseling upward. As the wound was deepened above, the portion of the external wall of the attic formed by the junction of the posterior and superior walls of the meatus, would come into view. This should then be removed with the gouge, exposing the aditus and antrum. As soon as the prominence in the horizontal semicircular canal came into view the operation should make one large cavity of the parts exposed. The posterior meatal wall must be cut down until it lay on a level with the tympanic cavity; then the niche of the round window could be easily seen. All diseased bone should be removed, but only such pneumatic spaces should be obliterated as were diseased. After the bony cavity had been thoroughly curetted, attention should be paid to the Eustachian tube. A small curette should be passed into the tympanic orifice, and any softened bone removed. The walls of the cavity should then be smoothed off with a burr, and then a firm packing of sterile gauze inserted. The posterior wall of the fibrocartilaginous meatus should be split so as to form two triangular flaps for covering the exposed parts above and below. The process of repair could be materially hastened by the application of Thiersch grafts taken from the patient's left thigh. These grafts should be one inch and a half by two inches and as thin as possible. A sponge should be held in such a way as to prevent any oozing of blood into the bony cavity during the application of the grafts. Sometimes it was necessary to make use of hot saline solution. The application of the graft should be made rather quickly in order to secure complete and deep adaptation of the graft to the bony wound; if done slowly the deeper part of the wound would fill up with blood. The grafts were held in place by judicious packing with pledgets of cotton dusted with aristol. These pledgets hold the grafts firmly against the bony walls, and thus allowed of the use of the needle to smooth out the curled up edges of the grafts. Experience had taught him that no harm was done if the edges of the graft happened to overlap each other, or even the cotton pledget. A strip of sterile gauze was applied over

the pledgets and brought out through the meatus. The posterior wound should then be closed by suture. The first dressing should be changed on the eighth day, unless there were special indications for an earlier dressing. The wholecutaneous wound would usually be found united at this dressing. At this time the strip of gauze and one or two of the cotton pledgets should be removed. A foul odor was often present, due to the sloughing of the overlapping portions of the grafts, but this did not indicate any failure of the operation. The pledgets were gradually removed at the subsequent dressings; at the time of the operation the number of pledgets introduced must be recorded with the history of the case. Out of 28 such operations, 16 of primary and 12 of secondary grafting, 26 had been cured, and 2 cases were still under treatment.

Some Unusual Mastoid Cases.

Dr. H. Bert Ellis, of Los Angeles, read this paper. The first case reported was one entering hospital on September 14, 1902. At the time the patient was more or less irrational talkative and semi-comatose. The mastoid antrum and cells were opened up and within a week the patient was rational, and she ultimately recovered with perfect hearing. The case was remarkable, because of the degree of mental disturbance and the small amount of disease. The second case was that of a woman of forty-eight, seen last October. She came to him because of a right-sided facial paralysis, which had suddenly developed one week previously. The mastoid antrum and cells were opened up, but no pus found. A few days later acute suppuration of the other ear developed, but was checked very quickly. In sixteen days the patient returned home without any paralysis. The third case was a Chinese boy of seven months. The disease had been rapid in its onset although there was no history of previous middle ear disease. Extensive bony destruction was found. In the next case a girl of four years was operated upon under difficulties, a double mastoid operation being done in a greatly enfeebled child, who became almost pulseless before leaving the table. Nevertheless recovery was satisfactory. The next case, one of paralysis, occurred in a woman of thirty. At the opera-

tion the cells and antrum were apparently healthy. They were converted into one cavity. The paralysis disappeared, but he was disposed to think there was no direct connection between the two. In the next case the external swelling was marked, and there was decided acute periostitis with necrosis, and yet no involvement of the antrum and cells.

Two Cases of Thrombosis of the Jugular Bulb; Ligation of Internal Jugular.

Dr. Norval H. Pierce, of Chicago, reported these cases. The first case was one of isolated primary thrombosis of the jugular bulb. The patient was a woman of thirty-seven years with a chronic discharge from the left ear. On admission, January 3, 1903, there was pain in the ear; the temperature was 101° F. and the pulse 112. The next day the temperature was 103° and the pulse 130. The discharge was profuse and the pain very severe, and there was infiltration and marked tenderness over the mastoid. A radical operation was done, and the mastoid cells were found necrotic and full of pus. Necrosis of the bone on a level with the floor of the middle ear was found extending inward toward the bulb. The patient's condition was such that no further operative interference was done at that time. Her condition grew worse, and on January 6 the sigmoid sinus was explored with negative result. The common jugular was tied on the following day, as grave septic symptoms continued. Afterward there was marked amelioration of these symptoms, but they again reappeared with exophthalmos and edema of both supra and infra orbital regions. Death occurred on January 14. The specimen was exhibited, and showed that the thrombus had extended up the inferior petrosal sinus to the circle of Ridley and thence to the ophthalmic veins.

The second case occurred in a man who had been operated upon a month previously for acute mastoid trouble without external evidence. The most prominent symptom was severe pain, especially over the occiput. He had had a chill the evening before, and on admission had a temperature of 103° F. On exploration it was found that the antrum had been thoroughly opened up previously. On chiseling away the mastoid he suddenly came upon a perisinus abscess, but

as there was no external evidence of sinus thrombosis the sinus was not opened at this time. The next day there was chill and a rise in temperature, and the sinus was then opened. It was exposed backward and then downward toward the bulb. The common jugular vein was tied. The temperature continued more or less elevated for the next three weeks, and during this time the pain persisted. The retinal changes which had been present before operation persisted, and when seen many months later one eye was still unchanged. He was confident that the thrombosis had extended up the inferior petrosal sinus, causing secondary thrombosis of the jugular bulb. In his opinion, it was not at all necessary to approach the jugular bulb itself through a bony passage.

Dr. E. B. Dench said that unless it could be demonstrated that there was a very free flow of blood through the sinus the latter should be opened at the primary operation. In a recent case the sinus was covered with pus, and yet the sinus itself appeared to be normal and he was about to refrain from opening it; nevertheless he did open the sinus and found there a thrombus. A delay of twenty-four hours represented the loss of very valuable time. He did not think the puncture of the sinus was of much value as a diagnostic aid. He had not seen a single case in which the incision of the sinus under aseptic precautions for exploratory purposes had been followed by an unfavorable result. Having opened the sinus and found nothing, he would pack the sinus with iodoform gauze and isolate the sinus with gauze. The sinus was destroyed, but this, he thought, was better than waiting twenty-four hours. He preferred the use of iodoform gauze to sterile gauze in cases in which the normal sinus was surrounded by suppuration. He had not observed any trouble from hemorrhage after the first dressing.

Dr. Pierce said that all of the symptoms of pronounced septicemia could be obtained from necrosis of the mastoid cells themselves, and that one could not tell from the course of the disease whether or not the sinus was involved. Even after having exposed the sinus for considerable distance it was difficult to say whether or not there was a thrombus which occluded the sinus entirely. For these reasons he felt justifiable to wait from twelve to twenty-four hours rather

than perhaps needlessly sacrifice the sinus. He had opened up the sinus in one case and had found absolutely nothing, and the patient had died a few days later. There was some hemorrhage on the removal of the first dressing, but it could be readily controlled by pressure with gauze. If fever and chills persisted he felt that the sinus was in all probability involved, and he would then open the sinus.

Dr. Dench, in answer to a question by Dr. Richards, said that if any of the tributary veins were left the infection might be washed through them. Experience had shown that the more completely the tributaries were tied off the better were the result.

Dr. W. C. Phillips referred to a case in which there was very extensive necrosis. He had exposed not only the sinus, but the cerebellum, and a portion of the cerebral fossa. On opening the sinus there was a tremendous hemorrhage, which could not be controlled by any ordinary gauze pressure. After very great loss of blood he controlled the hemorrhage by making a cork of gauze. At the time of the first dressing he took precautions against a recurrence of the hemorrhage, nevertheless it occurred and was very profuse. Difficulty was again experienced in controlling it, because there was no bone for counter pressure.

The Technique of Maxillary Antrum Operations.

Dr. H. Holbrook Curtis read this paper. He said that the first thing was to determine whether a second bicuspid tooth or molar tooth was the cause of the disease, and whether the discharge was acute or chronic. Irrigations through the natural orifice should be given a trial. If the natural orifice could not be used, and a tooth were suspected as the cause, then a tooth should be sacrificed and the opening utilized for the irrigation. It was quite easy to make obturators of varying shapes out of guttapercha. A sheet of guttapercha was dipped in boiling water, wrapped around a pencil and, after having been properly shaped, held in cold water until hard. An excellent irrigating fluid was composed of iodine, one drachm, pyrogallol acid, half a drachm and a saturated solution of boric acid sufficient to make one quart. The alveolar puncture was made for inspection, not for drainage.

If the tooth were not suspected other modes of entrance should be sought. Too many specialists were content with making an opening in the canine fossa, and then employing irrigation. In acute cases this might prove sufficient, but in the more chronic ones, it was absolutely necessary to thoroughly inspect and explore with the object of determining the exact pathologic condition present. When a radical operation had been decided upon the patient should be told that the length of time consumed in effecting a cure was very problematical, but that after a short time he would be comfortable and could attend to much of the treatment himself. The periosteum should be divided and turned back, and a chisel used to enter the antrum. The opening should be made sufficiently large to allow of the entrance of the bone forceps, and with the latter instrument the fenestration was completed. Strong carbolic acid and alcohol should be successively applied. The cavity could be still further cleansed by means of peroxid of hydrogen followed by normal saline solution. A gauze packing was then employed. After the granulation process had become well established, worsted should be substituted for the gauze, because it could be introduced through a smaller opening. After from two to four weeks the worsted packing could be stopped and the peg could be inserted. This method was capable of giving good results, but often failed. A better operation was that in which, after making the fenestration as already described, an opening was made into the nasal fossa. The larger the nasal orifice the better would be the result. After the bleeding had been arrested the antrum should be lightly packed with gauze or wool, and the wound in the canine fossa closed by two or three sutures. The packing should be removed, preferably under anesthesia, and if there was a foul discharge the antrum should be washed out. The opening in the canine fossa need not be so large in this as in the preceding operation. The operation through the inferior meatus was advantageous, because it required no anesthesia. It was, therefore, particularly applicable to patients who were not good subjects for anesthesia. With the electric trephine the anterior third of the inferior turbinate should be removed. The perforation should be made about one quarter of an inch above the

nasal floor. The fenestration should be made very smoothly.

The Report of an Unusual Case of Frontal Sinusitis.

Dr. Cornelius G. Coakley reported this case, one in which there was an absence of a septum in the frontal sinus. The patient was a woman of sixty-two, who had previously enjoyed good health, except for an attack of grip in 1890. In July, 1899, she began to suffer considerably from frontal headache, which ceased in a few weeks. In January, 1900, there was a swelling noticed about the right eye, and the eye was displaced downward. On January 28th it ruptured spontaneously, and discharged thick and slightly offensive pus. There was no discharge in the posterior nares. In October of that year she consulted the late Dr. W. B. Noyes, who advised her to return home for a radical operation on the frontal sinus. The fistulous opening was enlarged and a portion of the right frontal sinus was removed and the cavity curetted. No drainage tube was inserted in the naso-frontal duct. After some months packing was discontinued, and simple irrigation employed. The irrigation treatment was continued daily for about one year. She then came under the speaker's care, i. e., in January, 1903. The fistula was still present, and a probe, passed between the outer wall and the middle turbinate, encountered a small polypoid mass, which bled freely. The mucous membrane of the left nasal cavity was normal. Transillumination of the antrum gave perfect illumination on each side. Both frontal sinuses gave practically no illumination. The right middle turbinate was removed under cocaine. The underlying ethmoid cells were found filled with pus and granulations. These were all cleaned out and the catheter was passed into the right frontal sinus. The patient was advised to have the left frontal sinus explored first, and this was done. On January 4, 1903, under chloroform, an incision was made and the sinus opened. Thick pus escaped. The opening was enlarged until all parts could be explored by direct illumination. A similar opening was made in the anterior wall of the right frontal sinus. No trace whatever of a septum between the two sinuses could be found. Every trace of mucous membrane was removed from the frontal sinus cavity. There was a median posterior offshoot, and

this gave no little concern. The entire cavity was packed with strips of iodoform gauze, and this packing was not removed for two weeks, there being no discharge and no elevation of temperature. The probe then detected no dead bone. Irrigation showed the naso-frontal duct to be occluded. The cavity was wiped dry and repacked, and thereafter at intervals of about one week the packing was changed without irrigation. A remarkable feature was the fact that the total quantity of discharge did not amount to three drachms. The interesting features, aside from the abscess of the septum, were the very large size of the sinus and its healing without any osteoplastic operation.

Dr. G. L. Richards opened the discussion on the preceding papers. He said that he had had one case of double frontal sinusitis on which he had operated at two different times, and had in time been able to establish communication between the two. In a recent case the probe passed upward, and considerably beyond the median line.

Dr. L. A. Coffin referred to a recent case in which there had been no objective symptoms, but the boy had been brought to him because of the bulging of the forehead. He opened the right side first, supposing there was a double sinusitis. The bone was found to be as thin as writing paper, and the sinus was filled with pus. A small sequestrum of bone was found in the sinus, and in probing, he thought the instrument passed through the septum. On opening the other side he found a perfectly healthy sinus, and he could discover no communication with the right sinus. On removing the dressing on the second day the left sinus was found to be entirely healthy. Whether or not the sequestrum was merely the septum between the large sinus and what appeared to be an accessory sinus, he could not say, but the probe passed almost to the middle of the left eye. A week or two ago a laboring man had presented himself with a fistula, as in Dr. Coakley's case. An early operation would have prevented him for some time from earning his living, and hence, the speaker contented himself with taking off the entire middle turbinate, curetting the ethmoid cells and establishing good drainage. This relieved the pain.

Dr. Chevalier Jackson, of Pittsburg, said that his lamp

would show the septum in the frontal sinus if the sinus were normal. Where transillumination showed a diseased lining in the maxillary antrum he did not feel satisfied with a mere examination with the probe, and for that reason he made an opening in the canine fossa sufficiently large to admit the finger for examination and for breaking down any septic focus that might be present. To keep the opening patent for some time he made use of a small canula made of malleable metal, and after its introduction it was expanded by means of an alligator forceps, and was thus retained. It could be removed with slight force and without doing any harm to the tissues.

Dr. Price Brown asked Dr. Curtis if there were any age limit after which he would not do the radical operation for antral disease, and if in an aged person he would do the operation in the anterior meatus or in the canine fossa.

Dr. Thomas Hubbard, of Toledo, said he had used gutta-percha in some cases, and had found it very poor material unless the plugs were changed very often, because it retained septic matter and exuberant granulations formed. By vulcanizing and polishing the material it was rendered less likely to retain septic matter.

Dr. C. G. Coakley said he had been deeply interested in Dr. Curtis's paper, because it showed clearly the faults of treatment that was not radical. In his opinion, cases of antral suppuration were not uncommon, particularly after an attack of the grip. He had never seen one of these cases in which the diagnosis had been made by actual puncture and washing that had not recovered after a few washings. His present treatment was to wash out the antrum every other day with normal saline solution, and blow out afterward any remaining fluid. He was not referring to cases arising as a result of disease of the pulp of the teeth, for they did not do so well under washing. He had never felt that he could approach these cases through the middle meatus because this opening was ordinarily so completely covered with the middle turbinate. For this reason he cocaineized and made the puncture at the outer wall. In cases in which antral disease was suspected he did not hesitate to puncture, for, if done under aseptic precautions, it was attended by little or no risk.

Dr. Norval H. Pierce said he still claimed that the antrum could be reached occasionally through the natural opening. It was difficult, if not impossible, to get through the natural ostium in a natural position when the turbinate was of normal size, but in these cases of antral disease accessory openings were frequently present, as had been proven by Zuckerkandl. It was probably through those that one gained entrance to the antrum. He believed that it was good practice to make an attempt to enter through the natural opening before resorting to puncture.

Dr. Fred. C. Cobb, of Boston, said that the dentists seemed to have great difficulty in detecting bad teeth and differentiating them from good teeth, and hence one could not reply upon their decision in deciding upon making an operation. The washing out certainly relieved the pain, but he questioned whether it materially shortened the duration of the disease. He also doubted the efficacy of curetting the mucous membrane, because when the antrum became a reservoir for pus a polypoid condition existed in this cavity, and the condition was cleared up when the ethmoid was treated.

Dr. Curtis did not understand that Dr. Coakley had advanced arguments in support of the opinion that the septum had not been destroyed. He recalled one case in which by merely touching the septum with a probe the instrument passed through, showing how easily a solution of continuity of the septum could be produced. With regard to age limit, he would say that the third operation described was particularly appropriate for aged people. He did not vulcanize the guttapercha tubes, but if the patient were going away for some time he had the tubes finished up in this way by his dentist. The point made about vulcanizing them was a good one. He had experienced no trouble from retention of septic matter in the guttapercha. The test by heat and cold often enabled one to detect disease of the teeth.

Dr. Coakley said he had several cases of double empyema without communication from the sinuses. Mention had been made of secondary cavities, and it was well known that they not infrequently existed and constituted a bugbear in operating; for this reason a sufficiently large opening should be made in the anterior wall to make sure that such peculiari-

ties were not overlooked. He did not doubt that an opening might have been made in a septum under the tension that must have been present, but in his case there was absolutely no trace of any septum having existed, and the sinus itself was very large. He had just learned from Dr. W. C. Richardson that he had opened up a sinus in which a septum was present, and at a second operation he had found the septum entirely gone.

THIRD DAY.

The Eustachian Bougie; Its Use and Abuse.

Dr. M. A. Goldstein, of St. Louis, read this paper. He said that in 1865 rubber had been substituted for catgut, and the bougie was passed entirely by the sense of touch. Today, the celluloid, whalebone or electrolytic cold bougie was employed. It was often impossible without a bougie to determine accurately to what extent the catarrhal process in the middle ear had progressed. With the bougie one was enabled to outline the entire track of the tubal canal, and by the educated tactile sense determine the exact location of any constriction of the tube, and even ascertain the character and consistency of the tubal stricture. He believed the bougie should be used as regularly in every case of otitis media chronica as ocular inspection of the membrana tympani inflation. He had used the bougie liberally during the past ten years, and it had been his experience that the technique was not more objectionable to the average patient than the use of the catheter and inflation. He made use of the cold polished whalebone bougie in various sizes. By means of graduated olive-tips one could determine the calibre of the tube. As the normal average diameter of the isthmus tubii was $1\frac{1}{3}$ mm., it was not necessary to use a bougie of larger calibre than that designated as a five-thirds bougie, it was evident that the bougie was passing in a wrong direction. If the bougie were not in proper position deglutition would cause it to shift. If, on withdrawal, a decided kink was noted at the distal end of the bougie, it was an indication that the bougie was passing between the tip of the catheter and the pharyngeal wall, and had not entered the tubal canal. If the

patient complained of a scratching or sticking in the pharynx, going more deeply as the bougie was pushed forward, it was evident that the bougie was not entering the canal. As the bougie passed the isthmus tubii, the patient often complained of a sudden unpleasant sensation in the ear. Force should never be used in passing the bougie. If the tip of the instrument became engaged in one of the folds it was easy to produce a false passage if any force were employed. When such a break took place, a local emphysema was liable to be produced by subsequent inflation. The value of the use of the bougie was generally increased by immediate inflation of the tympanic cavity upon the withdrawal of the bougie, although in individual cases it caused increased discomfort. In such cases it should be omitted. The author was of the opinion that the bougie was of inestimable value, not only when there was a decided stricture of the tube, but when the calibre was diminished to less than $1\frac{1}{3}$ mm. The bougie here should be passed the full length of the Eustachian tube and left for a time varying from one to ten minutes. The first application was usually the most uncomfortable to the patient. The introduction of the bougie should be repeated every second or third day unless there was some unpleasant reaction, and the size of the bougie should be gradually increased up to No. 5. Perhaps the most frequent contraindications to the use of the bougie were a feeling of fullness and dullness in the ear and an increase in the subjective symptoms. The period of treatment was not usually over six weeks. Marked improvement was sometimes noticed after the first or second passage of the bougie. He had found the bougie occasionally of value in chronic suppurative otitis media. It was reasonable to believe that the use of the Eustachian tube bougie would prove of value in cases of subacute catarrhal affections characterized by the presence of thick or stringy mucous. With regard to the use of the electrolytic bougie the speaker said that one of the advantages of this instrument was the effect of galvanism, and another was the ease with which the instrument could be made to pass certain strictures which were impassable without such aid. He had used this bougie with from three to five milliamperes in 50

cases, and had obtained no better results than could be secured by the use of the ordinary whalebone bougie. Undoubtedly the instrument could be made to pass more easily, but there was apt to be a tendency for the stricture to return. The action of the current in such cases was not, in his opinion, true electrolysis, but rather a mild surface cauterization of the mucosa of the Eustachian tube.

The Possibilities and Limitations of the Electrolytic Bougie in the Treatment of Chronic Hypertrophic Catarrhal Deafness.

Dr. Arthur B. Duel, of New York, was the author of this paper, which, in his absence, was read by the Secretary. He had sent a circular letter to the members of the society, asking for their experience with this mode of treatment. Of the 25 replies, 2 stated that the method had been found of no value; 17 were of the opinion that the tubes could be more quickly opened; 9 reported the breaking of the bougie in the tube. The replies seemed to indicate that there had been a lack of care in attending to the original source of the trouble, and a lack of judgment in the selection of the cases suitable for this treatment. Experience has shown that the tube could be opened more quickly and more permanently than by any other method. Injury to the chorda tympani nerve had occurred in 3 of his own cases, and so far as he knew in no others. The wires should be made with great care, and should be inspected each time before use. Many of the diverse criticisms were thought to be founded on purely theoretical considerations. The galvanic current exerted a powerful resorptive effect. The author said he had found it of the greatest value only when it had been used but a few times. Dobell's solution should be used to wash out the nose and nasopharynx, and again, cocaineization of the parts should be resorted to before employing the electrolytic bougie. Bubbling sounds indicated that the bougie was rapidly passing through the stricture. Then a second or third obstruction would be encountered. The bougie should invariably be passed on into the tympanum. At intervals of a minute an additional milliampere of current might be turned on up to five minutes, and if then the obstruction could not be over-

come, further treatment should be postponed for about one week. Having passed into the tympanum, gentle inflation might be practiced at the end of two days. Sometimes the tube would be so blocked by swelling that inflation could not be practiced, and, of course, while this condition lasted, the patient's symptoms would all be aggravated. The author cautioned against using the method hurriedly and too often, and suggested that this treatment should not be taken up in connection with a busy practice, unless special appointments were made with the patients. So confident was he of the benefit of the treatment that he would feel compelled to continue its use, even though all the other members abandoned it.

Dr. Chevalier Jackson said that it was his opinion that the best method of treating the tube was by leaving it alone and treating the nose and nasopharynx. He had given the electrolytic bougie a faithful trial, and had found no greater relief than from other irritants, and no permanent benefit. The tube opened more quickly, it was true, but the final result was no better.

Dr. George L. Richards said he had practiced the method, and had encountered the breaking of the bougie, but had been unable to fairly understand the reason for the occurrence of this accident. In one case it was broken off at about 12 mm. The patient never knew of the accident, and it gave rise to no discomfort. In another case the bougie had been passed only once, and the result had been permanently good, except that the tinnitus had not been improved. In another case the hearing became worse and the woman suffered from a paralysis of the tear canals on the corresponding side. The method was certainly one which called for careful selection and the use of plenty of time, at least an hour. Ordinarily he employed the treatment from five to ten minutes with 4 or 5 m. a. and 30 volts.

Dr. W. C. Phillips said that for one year his clinic had been used for studying this method of treatment. The one case of mastoiditis reported had occurred in that service in spite of the employment of a very careful technique. However, he thought it could be positively asserted that there were certain cases of severe tinnitus, which were caused by ob-

struction in the Eustachian tube. If the obstruction were mucus, it would be temporary; if due to thickening of the membrane or a stricture, it would be more permanent. If the obstruction could be overcome and air made to pass, it was probable that the tinnitus would be relieved and that the deafness would not increase. He had used the electrolytic bougie on a large number of patients, and while Dr. Duel appeared to be rather enthusiastic over the method, it was capable of accomplishing very good results. He was of the opinion that temporary influence of the current enabled the operator to pass the stricture more easily than could be done without it; but that further than that the electricity was of no value. He commended the treatment solely for this aid given by the current. He had broken off one or two bougies in the tube while carefully demonstrating the method to the class. It should not be employed except by one having an excellent armamentarium and perfect control of the current.

Dr. Sargent F. Snow, of Syracuse, said that he had had no experience with the electrolytic bougie. He had used the hard rubber bougie at one time, and believed its use favored absorption, but in recent years he had abandoned it, because by other and simpler means he had secured equally good results.

He rarely met with a case of chronic catarrh of the middle ear and Eustachian tube that was not due to more than one cause. Almost invariably there was a nasal factor, and it required removal. He seldom encountered a bad case of deafness, unless there was in addition a systemic element. The electrolytic treatment was directed only against the obstruction of the Eustachian tube, and the other factors were ignored. Recent observations had convinced him that in autointoxication, chiefly from the intestinal tract, was to be found a very potent factor in chronic catarrhal deafness.

Dr. W. L. Ballenger, of Chicago, said that one should not overlook the difference between galvanism, electrolysis and cauterization. By galvanism was meant that method of applying electricity so as not to result in an appreciable breaking down of the tissue. By electrolysis was meant that softening effect on tissue, which resulted from the current, but

was not attended by sloughing or abrasion of tissue. By cauterization was meant a more powerful or concentrated effect of the galvanic current, characterized by sloughing or absolute and rapid destruction of tissue. Apparently Dr. Goldstein had confused these terms. In the method under discussion that strength of current should be employed which would produce only electrolysis. Dr. Phillips had declared his belief that the electrolytic effect lasted only during the passage of the current, but this, in the opinion of the speaker, was an error. Certain of the tissues were broken down by electrolysis into their primitive elements, hydrogen gas being liberated at the negative pole. The effects of electrolysis lasted much longer than the passage of the current; probably they lasted for some hours longer, because of the liberation of gases and other chemical products in the tissues. His experience had been that this method of treatment was not of great value, and he based this opinion largely upon the experience of surgeons with electrolysis in the treatment of urethral stricture. Some years ago the method was much in vogue, but at the present date it was but little employed except by those who made a specialty of electrotherapy. Genitourinary surgeons in general were of the opinion that the method was not very reliable, and certainly in the Eustachian tube the conditions for its employment were much less favorable. If the current strength were slightly in excess irritation would result, with the throwing out of cells which would ultimately cause the formation of fibrous tissue and eventually render the condition of the tube worse than before. While, therefore, the method might be used in selected cases, particularly those which were hypertrophies rather than genuine strictures, the danger of the method in the hands of the average practitioner must be such that he would enter a protest against at least any enthusiasm regarding this treatment.

Dr. Dunbar Roy said that he had been using the electrolytic bougie about four years, and before that, and even up to the present time, he had used the whalebone bougie a great deal. The value of the latter was certainly very great, and it was capable of giving equally as good results in the same class of cases as the electrolytic bougie. The personal equation undoubtedly entered very largely into this question, the

determining factor being largely one of delicacy of touch and skill in instrumentation. Dr. Goldstein had said that with the bougie he could obtain a good idea of the state of the mucosa in the Eustachian tube, but his own experience was that when the bougie passed the free end of the catheter leading into the Eustachian tube it rubbed against the wall and made it impossible to determine whether it was rubbing against the catheter or the mucosa. He did not think any living man could tell just when the end of the electrolytic bougie was going to pass into a fold of mucous membrane. He depended entirely upon inflation and auscultation for knowledge of the condition of the mucosa. Every catheter could not be made to pass into the tube, and for that reason he always made use of a malleable silver catheter which could be bent to fit any nasopharynx. Having determined the size of the nasopharynx and the probable distance to the opening of the Eustachian tube, the catheter was bent so that it would just go into the tube; only a little air would pass into the tube. The end of the catheter must fit thoroughly into the end of the Eustachian tube. Regarding inflation after the use of the electrolytic or the ordinary bougie, he would say that he never inflated, because he had had one or two very severe cases of emphysema extending well down on to the neck.

Dr. E. B. Dench said that after a very large experience he could not say that in the majority of cases the electrolytic bougie presented any great advantage over the ordinary bougie. The manipulation with the electrolytic bougie, it was true, was a little easier. He could only recall one case in which the tube appeared to have remained more patent after the electrolytic than after the ordinary method. This was counterbalanced by another case in which, after repeated use of the electrolytic bougie, one treatment by the ordinary bougie gave a permanent result. He, therefore, looked upon the method as a valuable one, but not one which was going to prove curative in any large number of cases which could not be equally well treated by older methods. One great advantage of the simple bougie was that applications could be made directly to the Eustachian tube, and this was of value even after the electrolytic bougie had been used. His own plan was to make use of a cotton-tipped wire dipped in

various medicaments. One excellent clinician claimed that he had found the electrolytic method particularly useful, because he had met with many strictures at the mouth of the Eustachian tube, and these yielded very easily to the current. Dr. Dench added that he had shown this gentleman that by simply bending his bougie a little more he could pass it easily into the tube without any use of the current, and that by the aid of the latter he had succeeded simply because he had caught and passed through certain folds of mucous membrane at the orifice of the Eustachian tube.

Dr. Goldstein, in closing, said that if the value of the electrolytic bougie was considered to be due to the galvanism, then it was only through its vasomotor action. It was quite probable that this action was valuable. But by the term electrolytic he understood destruction of tissue, either on the surface or under the mucous membrane, and in either case it would result in evil. The question of whether the treatment involved the employment of galvanism or of electrolysis should be settled without delay. The relief of tinnitus, as has been said, was often very marked with the electrolytic bougie when it could not be obtained by the cold bougie, and this he explained by the effect of galvanic stimulation. It was well known that galvanism would relieve subjective symptoms whether used in the Eustachian tube or applied in some other manner to the nervous system of the ear. If the result were only temporary, as appeared from the discussion, then the cold bougie gave practically the same result as the electrolytic bougie. The majority of the strictures occurred at the isthmus tubi, and it was not improbable that the rugae might be responsible, as Dr. Dench had suggested, for many of the brilliant results claimed for the electrolytic bougie. He had not observed any melting of the strictures from the use of the galvanic current in this way.

The Value of Exploratory Puncture of the Membrana Tympani.

Dr. Dunbar Roy, of Atlanta read this paper, reporting the history of two cases. The first case was that of a lady of forty who had always been nervous, and had been treated

previously for what had been diagnosed as "hysterical insanity." When seen by him she was fairly vigorous, and there was nothing abnormal in the nasopharynx. The right ear had normal hearing. The left drum appeared thickened and opaque. The Eustachian tube was open, and there was no mastoid tenderness. Bone conduction was much prolonged. She complained of much pain in the front of the ear. She was put upon increasing doses of iodid of potassium, iodine was used externally, and she was given galvanic treatment. The patient complained of such severe and persistent pain that, a few days later, the left drum membrane was punctured, and this gave vent to some glairy mucus, and gave decided relief. The following day a mucous polyp appeared at the opening, and was removed, and from that time on recovery of hearing and relief from pain were satisfactory. The case was narrated to emphasize the importance of a more general use of exploratory puncture of the drum membrane, a procedure which, if rightly performed, carried with it no risk. Many a mastoid abscess had been prevented by early incision of the drum membrane.

The second case was one of mastoid involvement following acute otitis media, and without the usual symptoms. The trouble had suddenly begun four weeks previously with severe pain in the right ear, and in vertex and occipital region. There was no mastoid tenderness, and the drum membrane on the right side appeared perfectly normal and free from moisture or congestion. Nevertheless the membrane was freely punctured and there escaped a small quantity of blood and mucus, and accordingly an immediate mastoid operation was done. Considerable healthy bone was passed through, and only a drop of pus was found in the antrum. However, several of the cells were filled with pus, and all of the mastoid was removed to the tip. During the operation there was a profuse mucopurulent discharge from the auditory canal. The next day the patient was very comfortable, and he made an uninterrupted recovery. This case illustrated the value of exploratory puncture, particularly in view of the fact that none of the usual indications for this procedure was present.

Dr. M. A. Goldstein opened the discussion on the two pre-

ceding papers. He said that at the meeting of the Middle Section of this society, held last year, he had presented a paper on influenzal otitis, and had discussed there in the value of a liberal incision of the membrane tympani in this type of case before there was even a bulging of this membrane. He had carried out this method in a number of cases with rather satisfactory results. In most of the cases the operation was done during the stage of congestion and while the membrane was retracted. The value of this incision he believed to be undoubted, as it not only gave relief, but provided drainage.

Dr. Clement F. Theisen said that he understood that exploratory puncture was done by Dr. Roy when there was simply a redness of the drum with bulging. There was no doubt that many cases could be aborted by such early incision, yet he believed that there was a certain danger of making this incision unless one was certain that there was fluid in the tympanic cavity, which would probably become purulent. He based this opinion upon the great danger of introducing infection from without. In some of these cases the use of the aural bougies, recommended by Dr. Richards would give relief and abort the case with less risk to the patient. In children, unless general anesthesia were employed, the spear shaped instrument was almost a necessity, because of the rapidity of manipulation demanded.

Dr. Snow heartily commended Dr. Roy's paper, and firmly believed that the general adoption of this method would greatly reduce the number of mastoid cases. He had never known puncture of the drum membrane to lead to any harm, if properly done. He had a case very similar to the last one reported by Dr. Roy. In that one there were symptoms pointing strongly to intracranial mischief, and he had advised immediate operation but could not obtain consent at that time. The next day there was a rupture of the drum, a free discharge of serous fluid, and coincidentally all of the urgent symptoms disappeared. He was now using bromid of ethyl as the anesthetic in connection with the opening of the drum membrane, and found it well suited to these cases.

Dr. Roy said he did not advocate puncture of the drum membrane simply for redness, but he intended to advocate

incision of the membrane without waiting for bulging provided there were symptoms pointing strongly to otitis.

Cases of Pyogenic Brain Diseases Associated with or Caused by Acute or Chronic Nasal Suppuration.

Dr. Thomas Hubbard, of Toledo, presented this paper. The first case was one of ozena with ulceration, osteosclerosis, leptomeningitis and death. The patient was a man of twenty-one with chronic suppuration of the left ear for over ten years. He developed a meningitis of the subacute type, with no unusual ear symptom. He had been using instruments freely for the removal of crusts from the ear. Only a hasty autopsy was possible. This showed the meninges bathed in pus. There was no infection of the temporal region, but the evidence pointed to infection from the nares. The second case was one of suppurative mastoiditis with a cerebral abscess. The patient was a woman of twenty-five who had had earache for many years and had been in the habit of picking the nose with hair pins. She suffered excruciating occipital pain. The autopsy showed the under side of the frontal lobe thickened and adherent by organized plastic lymph. There was an abscess in the centre of the frontal lobe. The patient died from morphin narcosis, but this was not unusual from morphin used in proper doses in such cases. The third case was one of ozena with acute accessory sinus infection and fatal meningitis. The patient was a girl of sixteen. The autopsy showed a purulent meningitis, probably arising from the nares. The fourth case was one of chronic intermittent purulent catarrh with operations on the septum and for adenoids. There was a latent empyema and a fatal meningitis. The patient was a girl of ten years. Commenting upon these cases, the speaker said that he was convinced that ozena was an important factor in such cases, particularly where operations were called for. The prognosis must necessarily be bad. The nares and accessory sinuses should be studied quite as carefully as the temporal bone.

Dr. Price Brown said, regarding the comparative frequency of tic douloureux arising from pressure within the nasal cavity, that when the pressure was circumscribed, as of the middle

turbinate upon the septum, the pressure was apt to be very intense. Frequently there was enormous pressure produced by growths, as for example, when the cavity was filled with polypi, without the causation of neuralgia. He had observed more pain from the pressure of the middle turbinate, but sometimes the enlargement was a compensation for the lower turbinate, and then there was not usually so much pain. In cases of pressure from antral abscess causing pain the latter was spasmodic and occurred occasionally, whereas the pain from septal pressure was always continuous.

Life Insurance and Diseases of the Ear.

Dr. W. C. Phillips, of New York, presented a paper with this title. He said that he originally intended to submit statistics from the medical examiner of the various life insurance companies, but the results of communications addressed to about 30 of these companies had been very disappointing, with regard to obtaining the desired statistics. It became apparent that whatever rules of any company, the final action was not dependent upon any statistical data. The replies indicated that the companies were anxious to obtain such statistics. Regarding the penalization of applicants who had suffered from acute or chronic otitis media no very definite information could be obtained further than the existence of such penalization. Nearly all of the companies refused or postponed such applicants, while two or three companies accepted such applicants on an extra premium. One company had a substandard class in which they accepted these applicants having ear discharges. Some of the companies accepted these applicants except when the discharge was bloody or gritty, pointing to involvement of bone. The writer then said that Schwarze's statistics pointed to 13.05 per cent. of all cases of aural disease being of the chronic suppurative variety. In three of the large London Hospitals there were 8,028 deaths, in 45 of which death was due to aural suppuration, giving one death to 128 from this cause. Randall, out of 5,000 aural cases reported 15 deaths due to aural suppuration, or one in every 133. In a period of eight years at the Manhattan Eye and Ear Hospital there were 64,858 aural cases out of which there were 218 presenting

serious intracranial complications. Statistics seemed to indicate that the dangerous consequences from suppurative disease of the ear were most frequent between the ages of twenty and thirty. The writer was of the opinion that continuous discharge with foul odor should be looked upon as evidence that the person was a life insurance risk. Large perforations and apparently free drainage, while militating somewhat in favor of the patient, should not be considered as a guarantee against the extension of the necrotic process. Radical operative interference was destined to become an important factor from a life insurance standpoint.

Dr. E. B. Dench said that the paper was of special value, coming as it did from one having large experience in otology. The paper presented facts rather than opinions, so that discussion was not in order except as regards conclusions. He had been surprised, with his increasing experience, to note how frequently a chronic purulent otitis with a large perforation would remain dormant for a period of from one to five years, and would then suddenly develop all of the symptoms of an acute otitis. Formerly he had been of the opinion that when there was a large perforation in the drum membrane and free drainage the patient was quite as free from danger as though there had been no suppuration; but he would change this opinion at the present time, and state his belief that while the person was comparatively safe, he was by no means entirely out of danger. He agreed with the reader of the paper that *probably* the radical operation would remove absolutely all menace to life, even though the discharge had not been absolutely controlled. However, cases of labyrinthian fistula should be excluded here.

Dr. Dunbar Roy said he had greatly enjoyed this paper, and believed it to be in the right direction, because otologists were consulted from time to time regarding applications for life insurance. It had always seemed to him that cases presenting distinct fetor were always severe ones, and could not be controlled except by the radical operation. He would give a fairly favorable prognosis as regards the insurance risk when there was no distinct odor.

Dr. Ballenger referred to a boy of about eight years on whom he done a radical mastoid operation, and had occurred

six or seven years later from meningitis. It was one of his earliest operative cases, and it was possible that the operation had not been a complete one. He did not know positively that the meningitis was of otitic origin. While the presence of a fetid odor was not usually a favorable omen, he knew that the odor might be present in cases showing no dangerous element. Some years ago he had presented a paper on this subject, though not founded on such extensive statistics.

Dr. Snow expressed the opinion that when a competent otologist believed he had removed the cause of the ear disease the life insurance companies should be more lenient toward such applicants. He believed that in not a few very serious and obstinate cases, presenting no history of syphilitic taint, a good result was only obtained after the free administration of iodide of potassium. A case in point was narrated.

Dr. Phillips, in closing the discussion, thanked Dr. Ballenger for having reported a fatal case after mastoid operation and supposed cure. The existence of a fetid odor was important, because it indicated the presence of necrosis. This was an important subject, because it made it possible for certain applicants for life insurance to be accepted if they submitted to the radical operation.

Dr. W. C. Phillips thought the author was to be congratulated on calling attention to such a very important subject, which was of interest not only to the otologist but to those who also treated diseases of the nose and throat. One should not lose sight of the fact that any condition of the nose and nasopharynx accompanied by a constant flow into these cavities of infective material of any kind, rendered the ear peculiarly susceptible to a sudden invasion of the infectious process. This fact was well exemplified in the cases reported in this paper. A very common cause of acute mastoiditis was well known to be the grip infection, and this became seriously complicated in cases in which there was already an active or passive suppurative process going on in one of the accessory cavities.

Dr. Price Brown said that as most of these cases were connected with atrophic rhinitis or ozena the condition should

receive particular attention. These cases were so exceedingly chronic, and were so little improved by treatment, that a practitioner was prone to forget the necessity of keeping the parts clean. If the parts were kept clean, such serious results would be much less likely to happen; hence, the practical lesson to be learned from this paper was obvious, and should be impressed upon the minds of all.

Dr. C. F. Theisen said that this paper taught one very important lesson long ago brought out by Grünwald, i. e., that an atrophic rhinitis was always secondary to a sinus suppuration.

Dr. James E. Logan, of Kansas City, asked if any special examination had been made of the sphenoidal body in the cases reported in the paper. He agreed with the previous speakers that the papers had brought out a very important point, i. e., the involvement of the accessory sinuses in atrophic conditions. He felt satisfied that in the cases reported some involvement of the sphenoidal body was present. The pathology suggested by Fraenkel and others, i. e., that a pathological condition antedated a hypertrophy, was certainly not to be credited at the present day. Many suppurative conditions prone to involve the middle ear, could be found to be antedated by a suppurative condition in the accessory sinuses.

Dr. Goldstein said that the paper taught the absolute necessity of a very careful and minute examination of the nasal cavities and their accessory spaces for the association of a possible mastoid complication in these suppurative processes.

Dr. Hubbard, in closing, said that he had presented the subject in this light for the special reason emphasized in the the paper. Three of the cases might have been reported merely as mastoid cases, but he had taken another point of view to bring out the necessity for studying the accessory sinuses to determine the prognosis in cases requiring mastoid operations. The pathology of ozena did not seem to him of great importance in this connection. He would rather incline to the view that ozena was an atrophic disturbance. He regretted that the autopsies could not be made more exhaustive.

Further Observations of Tic Douleureux and Cranial Neuralgia from Intranasal and Sinus Pressure.

Dr. Sargent F. Snow, of Syracuse, presented this paper. He said that in the twenty cases he had observed and treated he had seen none which required excision of the nerve to obtain relief. Each one showed marked intracranial pressure or a collection in some of the accessory sinuses. The acute forms he had seen accompanied cold or sinus accumulations. The subacute form might present an equal degree of pain but did not clear up with the removal of nasal obstruction. A pain-shooting outward and upward pointed to involvement of the anterior ethmoid, while a pain radiating around the lower jaw was commonly relieved by opening the sphenoid. The author was of the opinion that at least 80 per cent. of these cases were dependent upon intracranial pressure.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINO- LOGIC AND LARYNGOLOGIC LITERATURE.

I.— EAR.

The Relations of Auditory Rhythm to Nervous Discharge.

PROFESSOR MACDOUGALL contributes (*Psychological Review*, Vol. IX, No. 5; Sept., 1902) a discussion of the motor reactions which are aroused in the presence of a rhythmical series of sounds. Every presentation, he holds, tends to arouse some movement which, in kind, is imitative of the original. Consequently, unless some sort of inhibition supervenes, a succession of regular recurrent stimuli tends to set up a process of rhythmical movement, and, since stimuli which occur in periodic succession have a cumulative effect, there is a tendency for a form of movement of this kind, when once originated, to be perpetuated. Moreover, the kinesthetic sensation aroused by this imitative reaction is itself a presentation having the nature of an incitement to the repetition of the movement. This is the condition best observed in a simple nervous system, where in the absence of complications brought about by other simultaneously active processes, the origination of any movement tends toward the establishment of a rhythmical series of reactions. This process, obscured and disturbed by counter suggestions and the control of the higher centres in a highly developed nervous system, again becomes prominent in many pathological conditions. It appears in fever delirium in the meaningless repetition by the patient of a word or syllable which he has uttered or heard. It is also, Professor MacDougall believes, presented in the tetanic innervation of the muscular system characteristic of catalepsy and in the continued reproduction of a suggested movement by the hypnotic subject until the process is arrested by the hypnotiser. In more pronounced and obstinate forms it is manifested amongst idiots and the insane, where if it persists in an exaggerated type it is described as "echo-

lalia." These forms of activity are to be regarded as the expression of a primitive uncontrollable impulse to utterances, a reversion to a simpler type of activity, in which the elementary rhythms of motor innervation are uncomplicated by a richly-developed system of associated ideas. The fact that the rhythm activity represents a relatively undifferentiated type of reaction is also illustrated by the prevalence of the element of rhythm in primitive music and ceremonial. In its purest and most effective embodiment, as for example in rhythmic sequences of the drum tap, we have rhythm as the presentation of a purely sensory stimulus to the motor process, allowing the attention to centre in the reciprocal play within the sensori-motor arc, without the interference of a stream of changing ideas suggested by limiting stimuli from other sources. Dominant and effective rhythm can exist only in simple and musical and poetical compositions. In the higher forms of art the function of rhythm is essentially subordinate. It does not provoke any discernible type of motor response; losing its intrinsic significance for the esthetic subject in whose consciousness it appears, it serves chiefly as a secondary means of extending the scope of the attention process in its effort to grasp an ever wider set of pleasurable stimuli.

The Exercise of Common Sense in the Practice of Aural Surgery.

THEOBALD, Baltimore. (*Archives of Otolology*, Vol. XXII, No. 2.) The author thinks that there is a tendency for the otologist to give the middle ear too much and the naso-pharynx too little treatment.

Constitutional treatment is very important and the specialist must not commit the common error of regarding all troubles as local.

He recently had observed a case where vertigo, nausea and tinnitus had been relieved by correcting an error of refraction.

Campbell.

Affections of the Labyrinth Resulting from General and Organic Diseases.

POOLEY, New York. (*Archives of Otolology*, Vol. XXXII, No. 2.) The author classifies as follows:

(a) Cerebral anemia and Cerebral hyperemia which seldom cause serious ear changes.

(b) Hemorrhagic pachymeningitis and cerebro-spinal meningitis.

The latter the most common cause of deaf-mutism.

(c) Brain tumor.

(d) Parotitis. The occurrence of deafness from mumps, is next to that from scarlet fever.

(e) Syphilitic growths. The prognosis for hearing in acquired syphilis is better than in the hereditary form.

(f) Hysteria. *Campbell.*

Cerebellar Abscess.

EAGLETON, Newark, N. J. (*Archives of Otolology*, Vol. XXXII, No. 2.) A boy aged 14, with an old right middle ear suppuration, began to suffer from earache which radiated over the head, vomiting and vertigo. He lost flesh rapidly, became dazed, and one day was found lying on his right side on the floor apparently dying; his right arm and left leg frequently twitched. Temperature 99.3° F. Pulse 62. Optic neuritis on both sides.

On operation half an ounce of pus escaped from the cerebellar tissue near the posterior surface of the petrosa. For one week there was marked improvement, then pressure symptoms increased, and on following up the original sinus, a large abscess cavity was found, running toward the median line, and from it two ounces of pus was evacuated. Recovery was tardy, and the patient's mentality is dull.

Campbell.

Intradural and Later Double Cerebral Abscess Complicating Chronic Tympanic Suppuration; Operations; Cure.

RANDALL AND POTTS. Philadelphia. (*Archives of Otolology*, Vol. XXXII, No. 3.) A child aged 2, with a history of discharge from the left ear for 2 years. The discharge ceased; headache and vomiting set in. Tenderness and edema over the mastoid and bulging of posterior-superior canal wall. Temperature 102° F.

Operation was determined on and the child went into general

convulsions, more marked over the whole right side of the body. Temperature rose to 106.2° F, pulse 180. The mastoid was opened, granulations were removed, and pus found forming through the dura from the middle cerebral fossa. A restless night was followed by paralysis of the right arm and leg. Five days later temperature was normal, and motion returning in the arm.

On the tenth day the temperature again began to rise, pulse became slow, and in a few days vomiting and stupor supervened.

Exploration for brain abscess was deemed best, and through the operation wound without anesthesia a cerebral abscess containing 4 to 5 ounces of pus was evacuated. The cavity was cleansed by douching and cotton swabs and the wound packed with iodoform gauze. Three days later the pulse dropped again, the gauze was removed and fully 6 drachms of pus gushed from a second cavity lying above and posterior to the first one. Rubber drainage tube was now employed. Convalescence was uninterrupted.

Campbell.

Sarcoma of the Tympanum and Mastoid in a Child Aged Eighteen Months.

DENCH, New York. (*Archives of Otolaryngology*, Vol. XXXII, No. 2.) When first seen there were granulations in the auditory canal and paralysis of the sixth nerve. Opening the mastoid presented a cartilaginous, cauliflower-like mass invading the dura. This mass was removed and the patient subjected to x-ray treatment. Later the whole side of the head became very much swollen. The common carotid was tied to cut off nutrition, but the tumor is growing very rapidly and is invading the pharynx.

Campbell.

After Treatment of Radical Operations Without Packing.

MUEHLEN, Riga. (*Archives of Otolaryngology*, Vol. XXXII, No. 2.) The retroauricular opening of the wound is always closed primarily. The first tampon of iodoform gauze remains, usually for six days. The second tampon introduced very loosely is left for two or three days. Eight days are quite sufficient to fix the flaps to their new layer, and then

packing is discontinued. The ear is irrigated with warm water each day. This removes any irritating secretions; the newly formed delicate epithelium is protected from maceration and is permitted to spread out.

In case of fetid discharge, irrigation is supplemented by a wash of 10 per cent. naphthalian solution. Should granulations be exuberant remove the excess with a sharp spoon.

If a tendency to a formation of stenosis is apparent, then we must resume packing, and especially where there is a tendency for membranes to form between the middle ear and the mastoid cavity.

Campbell.

Epithelioma of the Auditory Canal.

WILSON, New York. (*Archives of Otology*, Vol. XXXII, No. 2.) An epitheliomatous nodule was removed from the posterior auditory canal of a man aged 28. After being twice removed it again recurred and was subjected to x-ray treatment. From 50 to 60 applications were made without the slightest reaction on the part of the tympanum. The growth shrivelled up and disappeared. Hearing normal.

Campbell.

The Limits of Variation in the Depth of the Mastoid Antrum.

KERRISON, New York. (*Archives of Otology*, Vol. XXXII, No. 3.) The author made sections of 30 bones and drew the following conclusions :

1. That in operations upon the mastoid process the antrum should always be approached from the nearest point upon the mastoid cortex, which in the great majority of bones is the small triangular space just behind the supra meatal spine.

2. That this point is not only a guide to the site of the antrum, but also gives fairly accurate data as to the antrum's depth. The average depth of the antrum from the cortex was 11 mm. The average length of postero-superior mental wall was 14.7 mm.

3. That the depth of the antrum is always less than the length of the postero-superior wall of the meatus; that in the great majority of bones it is not over 12 mm., is often very less, and is never greater than 15 mm. or $\frac{5}{8}$ inch.

4. That in exposure of the antrum a depth of $5/8$ in. should be regarded as the extreme limit of safety.

Campbell.

A Study of the Pathology of the Internal Ear and the Auditory Nerve.

MANASSE, Strassburg. (*Archives of Otolology*, Vol, XXXII. No. 2.) Case 1. Multiple disseminated grey degeneration of the auditory nerves.

A man aged 43 had succumbed to pulmonary tuberculosis. During his illness he suddenly lost his hearing and examination during life failed to reveal pathological lesions.

By gross and microscopical examination no lesion could be found in the middle or internal ear until sections of the auditory nerves stained with hematoxylin and eosin revealed a large number of pale areas, between the fibres and the nerve trunks. These areas consisted in greater part of fibres of various thickness arranged in an exceedingly delicate network and small sphenoidal lamellated bodies easily recognizable as corpora amylacea. By Van Giesen's and Weigert's stains the absence of nerve structures in these disseminated areas was conclusively proven.

Case 2. Disease of the labyrinths and the auditory nerves in a syphilitic subject.

A syphilitic, aged 35, died suddenly as a result of rupture of an aneurism of the basilar artery.

Fine granular deposits were found covering the epithelium of the roof of the scala vestibuli and the under surface of the lamina spiralis ossea and the basilar membrane in the scala tympani. The most marked and peculiar changes had taken place in the scala tympani, close to the modiolus. The new formation was made up of fibres arranged in a coarse network containing stellate connective tissue corpuscles at their intersections. The cells of Corti's organ were swollen, some containing beads of hyaline material. The vestibule and semi-circular canals contained numerous small hyaline highly refractive bodies in the space occupied by the perilymph.

Where the auditory nerve entered the labyrinth its fibres were separated by an interposition of round cells and blood corpuscles. At the porus acusticus internus the nerve was so distended that it completely filled the canal.

The pathological condition of both sides practically the same. On both was the sound-conducting apparatus normal.

Campbell.

The Treatment of Complications of Chronic Middle-Ear Suppuration.

McKERNON, New York. (*Archives of Otology*, Vol. XXXII, No. 3.) In all cases attention must be directed to the nose and naso-pharynx.

In acute mastoiditis if the case is of several days duration avoid the use of cold or heat, and make a bacteriological examination of the pus discharge; in all operations open the mastoid tip.

To render the dressing painless insert a sterile, perforated piece of rubber tissue into the bone cavity, and then pack in the gauze.

In all periosteal abscess cases, open the mastoid. In sinus thrombosis open the sinus with the scalpel, exposing the lower end of the sinus as near the bulb as possible. If the sinus contains a disintegrated clot or pus, resect the jugular vein ligating it at the clavicle and resecting it up to the bulb.

In brain abscess use scalpel and finger for exploration; be on the look-out for multiple abscesses, irrigate with warm salt solution and establish drainage.

Campbell.

Are there Variations in the Course of the Facial Nerve Having Bearing Upon the Mastoid Operation?

RANDALL, Philadelphia, (*Archives of Otology*, Vol. XXXII, No. 2.) The author examined 100 skulls, inserting straight probes into the stylo-mastoid foramina, and noted any deviation of the probes from the perpendicular.

In the sagittal plan deviations from the exact perpendicular were absent, while in the transverse plan 58 showed no recognizable departure from his positions. In no case was the deviation more than 10 degrees and in but 30 was it more than 1 or 2 degrees, and in 27 of these the direction was inward toward the vertebral column and not outward as generally claimed. In only 3 cases was the outward tendency notable and in these it varied from 5 to 10 degrees.

The distance of the facial canal posterior to the back wall

of the meatus was found never less than 2 mm. nor more than 4 mm.

The descending facial nerve crosses the oblique plane of the Mt. 3 mm. back of the middle of the posterior margin of the annulus. Therefore in removing the posterior meatal wall one should aim to cut below the tympano-mastoid suture in order to keep in safe territory. *Campbell.*

A Discussion on the Differential Diagnosis and the Treatment of Osteo-Sclerosis of the Mastoid Process.

STEIN, Chicago. (*Archives of Otolology*, Vol. XXXII. No. 3.) The author gives a historical resume of this condition, then differentiates it from :

- (a) Otalgia associated with inflammatory conditions of the middle and internal ear.
- (b) Hysteria and allied conditions.
- (c) Neuralgia from other than ear troubles.

Having made the diagnosis one's object is to relieve bone tension, remove as large a core of bone as possible, leaving the edges and surface of the cavity clean and smooth.

Campbell.

Subperichondrial Abscess.

KNAPP, H., New York. (*Archives of Otolology*, Vol. XXXII, No. 3.) A child aged 5 had suffered for a month from otitis media suppurativa acuta. When first seen the cartilaginous walls of the concha, including the crus and spine of the helix, were swollen and bluish, under the spine fluctuating. The calibre of the ear canal was narrowed, containing thin pus.

The posterior wall of the cavum conchae and the lower spine of the helix were incised, allowing thick pus to escape, thus differing from the thin, flocculent liquid seen in chronic perichondritis.

Probing discovered an abscess cavity extending inward to the osseous auditory canal. So the posterior-inferior meatal wall was split its whole length. The cartilaginous wall was scraped, carefully dried and packed with sterilized gauze. There was no further pain or discharge, the dressing was left in place for one week, then removed. The auricle

was healthy and in good shape, the canal dry and normal, the hearing good with Mt. slightly opaque. *Campbell.*

A Brief Report of Forty Radical Operations for Chronic Purulent Otitis and Complications.

KNAPP AND JORDAN, New York. (*Archives of Otolaryngology*, Vol. XXXII, No. 2.) This series of cases embraces the greater number of pathological conditions which demand radical operation.

The method of operating was according to Zaufal, Kuster or Stacke, and in making the plastic flap care was taken to dissect out the cartilage in the conchal part.

In six cases labyrinth fistulae were found, and in four there were intracranial complications. *Campbell.*

Three Cases of Encephalitis in Connection with Otitis Media.

Voss, Riga. (*Archives of Otolaryngology*, Vol. XXXII, No. 3.) These cases developed acutely with general cerebral symptoms, and in two of them focal symptoms of motor aphasia. In all there was sudden rise of temperature, drowsiness and slowing of the pulse. In the one case which came to autopsy the dura was found adherent to the pia in many places. Considerable edema of the pia over the parietal lobes, and on the lower surface of the right temporal lobe a yellow softened spot in the cortex. *Campbell.*

Abscess Sac at the Site of the Sacculus Endolymphaticus.

HORNE. (*Brit. Med. Jour.*, July 12, 1902.) Specimen exhibited at the Otolaryngological Soc. of Great Britain.

Case of Chronic Suppuration of Middle Ear. Cerebellar Abscess.

ROUGHTON, (*Lancet*, July 15, 1902.) When under chloroform breathing ceased, under artificial respiration trephining was performed, and a left cerebellar abscess was opened, after failure to find pus on the right side. Spontaneous respiration recommenced at once on evacuation of pus, but death occurred six hours after operation. There was no caries or necrosis of temporal bones. Mesenteric glands enlarged.

(There is no reference to examination of the pus for tubercle bacilli. Still it was doubtless tuberculous.—Abst.)

Occlusion of the Lateral Sinus and Internal Jugular Vein an
Essential Part of the Method Employed by Nature,
and by the Surgeon in Imitation of Nature,
for Arrest of Acute General Infection
Having Its Origin Within the
Temporal Bone.

CHARLES A. BALLANCE, M.S. Lond., F.R.C.S., Eng. (*London Lancet*, Sept. 20, 1902. Abstract by Dr. Wyatt Wingrave.) In this paper I propose to discuss, not details of cases, but fundamental principles, and it therefore appears to me to be of the first importance to survey the position from the widest standpoint of surgical knowledge and practice.

Septicemia and pyemia, which arise from infection of parts of the body other than the temporal bone, may present various clinical varieties, (1) a fulminating general process without active inflammation at the seat of inoculation, as in acute septicemia resulting from a puncture made at a post-mortem examination without the occurrence of abscess in a finger which was pricked; (2) a fulminating general process with signs of inflammation at the seat of inoculation; (3) cellulitis rapidly spreading from the site of local inoculation with signs of violent general infection, as in acute traumatic gangrene; (4) acute local suppuration in bone with septic thrombosis of the venules, the infection being carried from these into the general circulation, as in acute osteomyelitis; and (5) infection from without of a local chronic suppuration, the pus putrefying and causing subsequent general infection, as in the case of necrosis after amputation so commonly seen before the antiseptic era.

SOME REMARKS ON VENOUS INFECTION.

When the general infection is very acute it 'seem that the circulation must be primarily involved in the infection.* A

*See Muir and Ritchie's *Manual of Bacteriology*, page 153, and "An Experimental Investigation of Pyemia," by Gaertner, *American Journal of the Medical Sciences*, March, 1902. The author produced pyemia by introducing artificial thrombi, formed of infected pieces of cotton wick covered with gum arabic, into the jugular vein.

clear statement of this important pathological fact was made by the ghost of a fatal case of aural septicemia:—

“And in the porches of mine ears did pour
The leprous distillment; whose effect
Holds such an enmity with blood of man
That swift as quicksilver it courses through
The natural gates and alleys of the body.
And with a sudden vigor it doth possess
And curd----
The thin and wholesome blood.”*

Why is general infection uncommon from a finger prick? Because the infective particles do not find a ready way into the general circulation but are dealt with by the cellular tissue. In slight wounds capillaries rather than venules are punctured. Moreover, the superficial veins of the limbs run a long course before joining the large deep veins, and their valves are sites at which septic matter is not seldom arrested. Why is general infection so common a result of septic infection of the uterus after child-birth? Because there is a ready way into veins of large calibre, with but little protective cellular tissue intervening. An illustration of the disastrous effects of sudden access of septic material to the general circulation is afforded by the violent septicemia which occasionally follows operations involving the opening up of old and septic sinuses. Again, unless the local anatomical conditions are specially favorable to the infection gaining the interior of a large vein, infected blood from a local infective area is largely diluted with pure blood before reaching the heart. Even with large collections of pus, as in empyema, unless the pus becomes putrid a considerable time usually elapses before the patient is seriously threatened with general infection. Varying virulence of the infection can only be judged of by its effects. Independently of the nature of the micro-organism the manner of inoculation may influence the result. “Sinus-phlebitis is most frequent in streptococcus otitis. All infective agents which may give rise to otitis may on occasion cause a pyemia spreading

*Hamlet, Act I, Scene 5.

therefrom, but are only exceptionally observed in proportion to streptococci."*

The distinction of septic infection from septic intoxication is not often required; it is important, however, to bear it in mind. A few years ago I published a case of lateral sinus sapremia which bears this out.† Brieger refers to cases of toxemia and goes on to say: "Eulenstein saw such a case of acute pyemia in which metastases were absent, caused by mural sinus thrombosis; continued fever of several days' duration was alone present with sudden death in collapse, apparently a pure toxic effect."‡

* Free circulation of the infective agents in the blood-stream is the essential condition of general infection. This may be a primary result of the initial inoculation or may occur secondarily after local effects have been produced. The explanation of these differences is not clear. A quite similar phenomenon occurs in certain of the acute specific fevers.

In acute general infection coagulation of the blood in a large venous channel is not a common occurrence. It is indeed accidental in the sense that its occurrence depends, as a rule, on the spread of inflammation from the primary source of infection to the wall of the great venous channel. In acute suppuration surrounding a large vein the vein is seldom affected, tension of pus and direct entry of small veins into the large vessels being absent, and the lymphatic sheath barring the infection of the venous wall. For example, the internal jugular vein does not usually become thrombosed as a result of angina Ludovici. The conditions are the exact opposite in suppuration surrounding the lateral sinus; the pus is under great tension, there is abundant opportunity for small infection, and there is no lymphatic sheath. In osseous tissue generally direct venous infection is more likely to occur than in soft tissue, but nowhere do veins from bone enter a large venous channel after a shorter course than in the temporal bone, and this, I think, constitutes a special source of danger.

*Brieger; Verhandlungen der Deutschen Otologischen Gesellschaft auf der Zehnten Versammlung in Breslau, 1901, p. 67.

†Allbutt's System of Medicine, article "On Certain Affections of the Ear," Vol. VII, p. 604.

‡Brieger, loc. cit., p. 76.

From much that has been written on the subject it might be thought that thrombosis of the lateral sinus or jugular vein is a necessary step in the development of septicemia or pyemia from temporal bone disease. This is not so; the occurrence of thrombosis is here an accidental phenomenon due to the peculiar anatomical relation of the lateral sinus and the jugular bulb to the temporal bone, which has no exact counterpart in the rest of the body. The lateral sinus being situated in a groove in the bone itself, in close proximity to, and in intimate connection with, the diseased area, becomes involved in the local septic process and thrombosis results. The sinus thrombosis is really a *protective measure* and when the clot remains uninfected it is successful.* The thrombus, however, may become infected and the disease will then

“Break out into a second course of mischief.”†

Thus is set up an additional source of danger often of such gravity that it overshadows the primary disease.

Thrombosis occurring in a great venous channel like the sinus, does not lead to its sudden occlusion. The clot which first forms in the vessel as a result of an alteration in its lining membrane lies along the wall of the vessel but does not occlude its lumen. By the addition of successive layers the clot may extend so as completely to arrest the stream of blood through the vessel. Blocking of the channel may, however, not occur in consequence of the cessation of the clotting process, or the block may fail to be permanent by reason of the construction of the clot. From the close proximity to, and intimate connection of the vessel with, the infective area in the bone infection of the clot occurs, so that there comes to be an additional local centre of infection continuous with the primary one, from which not only micro-organisms but gross particles of infective clot may be carried into the circulating blood. Then there is present that most dangerous condition—an infective thrombosis with but a partially obstructed blood current. It is here that the surgeon may happily complete what nature has failed to carry

*See some remarks by Jansen, *Verhandlungen der Deutschen Otologischen Gesellschaft*.

†Henry V, Act IV, Scene 3.

through. In the rare cases in which septicemia or pyemia occurs from temporal bone disease without obvious infection or destruction of the sinus or vein the infection has been so virulent that no local protective thrombosis has ever been attempted. It is the secondary infection of the clot and *not the occurrence of thrombosis* that constitutes the danger.

Brieger appreciates the fact that thrombosis is an epiphenomenon. He says: "Such metastases without the intermediary of venous thrombosis occur in mucous membrane affections analogous to middle ear suppurations. Such are the secondary manifestations of gonorrhea which may be described as gonococcus pyemia. The occurrence of this form of pyemia without sinus thrombosis by means of purely bacterial emboli rendered probable by clinical observation is becoming unequivocally demonstrated by anatomical observations. It is especially in pneumococcus otitis that general infection of this nature occurs."* On rare occasions the blood may so teem with microbes that when clotting occurs in the sinus the thrombus may from the first be infected.

When thrombosis takes place in a large vein from the milder septic infections of the cervix uteri, though the local effects of the blocking of the venous channel are troublesome enough, there is not commonly breaking down of the clot and pyemia, because the conditions leading to the secondary infection or clot are for the most part wanting.

Jansen† explains some rare forms of rapidly fatal general septic infection by referring the path of infection to the lymphatics. If this were so, it would really be *venous infection at another point*, but the narrow calibre of the lymphatics and the intervention of glands along their course render it difficult to understand how general acute infection can occur by way of the lymphatic system without intermediate local effects. In these cases a local gangrenous process of bone and soft parts sets in,‡ putrid pus exudes, and the surface presents a greenish-grey appearance. "The examination of the

*Brieger, loc. cit. pp. 39-41.

†Encyklopädie der Ohrenheilkunde, von Louis Blau, Article, Septicämie Otitischen Ursprunges, p. 363.

‡See description of case by Ballance, Transactions of the Otological Society, vol. ii., p. 37.

bulb of the jugular has not always been made with such care as is needed to detect small circumscribed diseased spots in parts of the vessel wall which are only with difficulty accessible. In the case of acute sepsis which I have observed I have found," says Jansen, "thrombo-phlebitis of the jugular in which the septic thrombus was not shut off by firm uninfected thrombus. In this particular form of septic illness such (thrombotic) processes, or only mural thrombi, alone come in question and not the common form of occlusive thrombo-phlebitis. The observations found in literature are not all beyond doubt. Whether, or how, the bulb of the jugular was examined is mostly not apparent. So there still drags the decision of the question as to how far this particular clinical type of disease really occurs without the intermediary of involvement of the sinus or jugular vein."* "By the pressure of an extradural abscess the sinus may be obstructed and the development of a thrombus brought about in a purely mechanical manner (as by an aseptic ligature which causes coagulation by inducing a proliferation of the endothelium) without any infection and without the possibility of a secondary pyemia. The outer wall of the sinus is thin, being only the thin outer layer of the dura. The septic infective process much more readily spreads through this thin wall and reacts upon the endothelium and sinus contents than through the whole thickness of the dura. The immediate effect of an extra-dural abscess is for the most part confined to the outer layer of the dura, the sinus is thrombosed, but the brain is found still covered by the intact inner layer of the dura. The thrombosis which is caused by compression of the sinus in a purely mechanical manner may, when the focus of infection has been removed, remain uninfected. To attack such a thrombus by operation would be an error. Even contact with the needle used for paracentesis (a futile procedure in any circumstances) might infect it. The earlier pyemia arises in acute ear infections the more probable is it that the point of departure of the general infective process is to be sought in the bulb."†

*Jansen, loc. cit.

†Jansen: *Verhandlungen der Deutschen Otologischen Gesellschaft*, 1901, p. 14.

The small mural thrombi alleged so often to have been overlooked in the bulb are not necessarily the cause of the pyemia. They may in some cases represent an *abortive attempt at protective occlusion*. Too much stress has been laid on the lateral sinus and the jugular bulb as the sole seat of infective thrombosis. I have had a case of pyemia due to superior petrosal sinus infective thrombosis, without thrombosis of the lateral sinus. This point is touched upon in certain of the text-books* and by Jansen.† Brieger‡ says: "Primary thrombi arise in the superior petrosal sinus, especially from suppuration in the labyrinth, and are also observed in acute suppuration in the tympanum in scarlet fever." The size of the lateral sinus concentrates the mind too exclusively upon it, while in pyemia resulting from disease in other regions of the body, no large vein being in near proximity to the disease, the attention is not distracted from the numerous small veins, each one of which may harbor an ineffective thrombus which may equally produce the disease.

The process of disease in the temporal bone and in the tissues around it is one *continuous* infective process. It is a mistake to think of the infection of the osseous, dural, and blood tissues as separate pathological entities. The differences are anatomic and physiologic, not pathological. As the spread of the infection is by continuity of tissue the infection of the dura, for obvious anatomic reasons, precedes that of the blood. The march of the infection will thus be in this order: perisinusitis, sinusitis, blood infection. Infection of the blood suddenly brings into being a new factor, for it is infection of a tissue the liquid texture of which confers upon

*See Barr, *Diseases of Ear*, third edition, pp. 286, 365 and 366 Politzer: *Lehrbuch der Ohrenheilkunde*, fourth edition p. 495. "Less common paths of infection are the inflammations which spread along the internal auditory vein or the veins of the aqueduct to the sinus petrosus inferior;" and again: The sinus transversus passing along the inner side of the mastoid process is most frequently attacked by the purulent inflammation: more rarely the sinus petrosus superior and inferior, the cavernous sinus and the jugular bulb.

†Jansen, loc. cit. p. 14.

‡Brieger, loc. cit. p. 65.

it the physiologic property of constantly traveling through all the tissues of the body.

SOME SURGICAL AND PATHOLOGICAL REMARKS.

Nature's process for the prevention of general infection is sequestration of the infective material, as is shown by the formation of local abscess. Thus nature surrounds the poisoned tissues, be they in bone, in dura, or in blood (by coagulation), with an inflammatory barrier; and the surgeon, as the plan of nature for the saving of life is unfolded before his vision, learns the lesson of how, and by what means, surgical art may successfully deal with acute septicemia and acute pyemia. These cases have one thing in common—they are always acute. The only subdivisions we can recognize have to do with their early history and are as follows: (1) those in which the acute illness follows on and develops from a chronic suppuration, and (2) those in which the acute illness is but a further stage of a recent acute suppuration. But these differences in origin do not justify the notion that the surgical treatment suitable in the one case is not equally right and proper for the other. I contend that the principles of surgery apply in either case without modification, detraction, or alteration. Koerner* quotes from Schwartze that "more than half of the cases of otitic pyemia get well without ligature of the jugular, by simply opening the antrum with or without clearing out the broken-down thrombus in the sinus;" and he adds as a comment: "Here cases of pyemia with and without sinus-phlebitis are confused together." I cannot but think that there is also confusion in Schwartze's statement between the cases with pyemia and the cases which, though acutely ill, had only a local affection. Just as a patient has pus pent up beneath the palmar fascia, though he may be acutely ill, is not necessarily suffering from septicemia or pyemia, so it is true that a patient with temporal bone suppuration, though acutely ill, may also be the victim of a *local rather than a general process*. This is a point upon which the surgeon's mind should be clear before he proceeds to operate. In the temporal bone there may be

*Die Otitischen Erkrankungen des Hirns, second edition p. 79.

acute or chronic suppuration spreading from the tympanum and mastoid to the lateral sulcus without obvious thrombosis or severe inflammation of the lateral sinus and jugular vein. In such a case operation on the sinus or vein is not necessary unless there is evidence of general infection. "When a phlebitis has been exposed we are justified in stopping the operation and awaiting the result, if the patient is not already suffering from a severe pyemia." *

Even if suppuration has involved the dura mater and coagulated the blood in the sinus the opening of the local abscess in the groove or in the sinus may cure the case—i. e., if nature has provided against general infection by occlusion of the sinus. Brieger says: "Even a thin layer of a sound clot may be an efficient barrier against embolic detachment of particles. If the apparently healthy terminal portions of clot are allowed to remain suppuration may, however, occasionally arise therefrom. As I have demonstrated, not every apparently sound portion of terminal clot is poor in bacteria. The subsequent breaking down of these terminal portions has, however, scarcely any danger provided that there is such a free opening as to ensure the ready escape of the products of suppuration." (The danger is diminished if there is a free opening, but is it true that it scarcely exists? Do we in these cases obtain an opening which is surgically free? The danger would surely be much less if the jugular were tied.) "Certainly, if we restrict ourselves to the removal of the pus or the breaking down clot we may overlook a spreading 'disconnected' thrombus on the far side of the sound portion. Against this the most complete clearing-out of the sinus will not protect us."†

The sinus and vein constitute the main route by which the infective agents travel, whether thrombosis has occurred or not. If nature has placed an effectual block in the shape of an uninfected thrombus on the cardiac side of the infective focus the surgeon has been anticipated in the most efficient and effectual manner. But as Viereck‡ remarks: "Surely

*Jansen, loc. cit., p. 28.

†Brieger, loc. cit., p. 97.

‡Verhandlungen der Deutschen Otologischen Gesellschaft auf der neunten Versammlung in Heidelberg, 1900.

we should not rest content with the always doubtful evidence of occlusion which an apparently sound thrombus affords if we considered ligature (of the jugular) as entirely free from danger." It cannot, then, be true that in a given case there are indications and contra-indications for operation on the vein.

The question is as to the *exact diagnosis*, not as to the right method of treatment, for in a particular morbid condition there are not two right plans of treatment but one right plan of treatment.

There may be doubt as to the exact pathological condition present and then vacillation as to the course to be pursued may arise. From the experience, often dearly enough bought, of many workers, certain valuable guiding principles of treatment can be with some precision formulated and much of the knowledge which has been gathered can be imparted.

Although the danger of infection by way of the blood stream cannot be said to be averted completely unless all the blood from the infected area is arrested (and as ligation of all the veins and lymphatics is impossible this condition cannot be realized by any measure short of complete excision of the whole diseased area, which is, indeed, also impracticable), yet, as the internal jugular vein in the direct highway along which in these cases highly infected blood is reaching the heart by a short route and with little further admixture with pure blood from uninfected regions, the establishment of a block in the highway must prevent direct access of infective material and so greatly reduce the risk from the primary source.

Experience has shown the great efficacy of the operation on the vein, even though the whole of the local disease may not have been removed, as in Case 4 of my first paper.* It is, therefore, idle to maintain that the collateral circulation through occipital and petrosal sinuses and the condylar and vertebral veins renders abortive the surgical occlusion of the main sinus and vein. These latter represent the wide gate and broad highway that lead to destruction, and when

*Ballance: On the removal of Pyemic Thrombi from the Lateral Sinus, Transactions of the Medical Society of London, Vol. xiii.

these are obstructed if the poison finds a new pathway to the general circulation it encounters a narrow gate and circuitous route which retard its progress and tend to dilute its virulence.

Brieger, in a statement qualifying his recommendations for ligature, says: "It is questionable whether ligature is needed for the obliteration of the jugular or whether its obliteration may not be spontaneously brought about just as surely as by ligature through certain processes following sinus thrombosis.* It might be just as truly maintained, I think, that operation should be discarded in a case of empyema, since a collection of pus in the chest may be limited by adhesions and discharge spontaneously.

It has sometimes been objected that the operation on the vein is a dangerous procedure and all sorts of bogies, such as edema of the brain and the entrance of air, have been conjured up to throw light upon the wisdom and advisability of the procedure. In general surgery the jugular vein is constantly removed in order to facilitate the ablation of glandular and other tumors of the neck, and in my view the operation presents, in skilled hands, no danger and "the loss of the vein does not make the slightest difference to the patient."† It must be remembered that in most of these cases the operation recommended does not block a still patent venous channel but one which is already packed with septic clot and more or less impermeable. "The only objection that could be urged against the doctrine of dealing with an apparently uninfected clot in the radical way suggested is that cases not due to ear disease are known in which recovery has taken place after non-septic thrombosis of the lateral sinus, and that in these cases canalisation of the clot may occur, so as to allow of the passage of blood again along the once-plugged sinus. The objection does not appear to me to have any weight, and the risk of leaving untreated a clot in the immediate neighborhood of very virulent septic matter in the hope that it may remain uninfected seems so great that it puts out of court what is at best only an imaginary advantage—viz.:

*Brieger: *Loc. cit.*, pp. 102, 103.

†W. Watson Cheyne: *Harveian Lectures*, p. 37.

the chance of the sinus becoming patent again and thus functionally useful to the patient *

STATISTICS AND OBSERVATIONS OF SOME SURGEONS.

The appeal to statistics does not have so great weight with me as the matured judgment on the matter in dispute of an experienced surgeon. This is in part due to the fact that probably in most of the worst cases the jugular is tied, and secondly because in the majority of cases in literature there is no such account as will satisfy a critical examination or will justify a critical personal judgement as to the (*a*) virulence of the disease, (*b*) the local conditions found at the operation, and (*c*) the appropriateness of the measures employed by the surgeon. Nevertheless, some figures given by Viereck† are sufficiently instructive to quote. In 94 cases of uncomplicated thrombosis of the sinus the jugular vein was tied in 40; six died from pyemia and 34 recovered (85 per cent.); and of these recoveries 28 (70 per cent.) were without complications and six (30 per cent.) were complicated with fever and metastases. Of the 54 cases in which the jugular was not tied 13 died from pyemia and 41 (76 per cent.) recovered, and of these recoveries 14 only (46 per cent.) were without complications and 27 (54 per cent.) were complicated with fever and metastases. It therefore appears that ligature prevents metastases. Viereck sums up: "In ligature (of the jugular) we possess a method which prevents pyemic infection more surely than does operation on the sinus alone, with which, therefore, it should always be combined. In order to avoid the danger of detachment of fragments of clot and of entrance of air into the vein the operation on the vein should precede that on the sinus."

*Ballance, loc. cit.

†Viereck, loc. cit. The account of the cases quoted is even more instructive than figures from the point of view of operation on the jugular.

VIERECK'S TABLE.

94 Cases of Uncomplicated Thrombosis of the Sinus.

—	40 with ligation.	54 without ligation.
Died from pyemia.....	6-i.e. 15 p. cent.	13-i.e., 24 per cent.
Cured.....	34-i.e. 85 “ “	41-i.e., 76 “ “
Cured without comp- lications.....	28-i.e. 70 “ “	14-i.e., 46 “ “
Recovered with fever and metastases.....	6-i.e. 30 “ “	27-i.e., 54 “ “

14 Cases of Thrombosis of the Sinus and of the Internal Jugular Vein.

—	12 with ligation.	2 without ligation
Cured without comp- lications.....	12	0
With metastases.....	0	2

Brieger* says: “In the cases of pyemia in which, on account of the negative result exploration of the sinus, I have believed that mural thrombi were present, I have seen recovery occur without ligature of the jugular, although at least one of the cases was characterized by special severity, particularly on account of the number and character of the metastases.” Ligature, it would appear, is most important when the sinus is not completely obstructed by clot.

At the meeting of the German Otological Congress in Breslau in 1901 Jansen, for whose judgment and operative skill I have the highest regard, read a very important paper. He stated that pyemia there was always a diseased sinus; in four only out of his 63 cases had he failed to prove the presence of sinus-thrombosis.† He recommends ligature of the jugular:—1. As the first step of the operation (*a*) in undoubted cases of jugular phlebitis and (*b*) in severe sepsis. 2. After exposure of the sinus (*a*) if the sinus appears sound and there

*Brieger, loc. cit. p. 100.

†Jansen, loc. cit.. p. 35, 36.

is no perisinous affection, but rigors and marked oscillations of temperature are present, and (*b*) in periphlebitis and mural thrombosis under the same conditions. The sinus should be opened (*a*) on the evidence of the presence of septic broken-down thrombus, when the result of puncture is negative; (*b*) in gangrene of the sinus wall; (*c*) in repeated rigors, marked oscillations of temperature, and poor general health; and (*d*) when optic neuritis is present, in most cases if not always.

3. After incision of the sinus (*a*) if septic thrombus is, or was, situated in the immediate neighborhood of the bulb, and (*b*) if after the incision of the sinus the rigors do not cease or the temperature materially decrease or should other cerebral symptoms persist. Jansen's table of 50 cases is as follows. Of 30 cases without ligation 22, or 73 per cent., of the patients recovered, and of 20 cases with ligation 13, or 65 per cent., of the patients recovered. Notwithstanding Jansen's numerous successful cases which recovered without operation on the vein, yet his recommendations for operations on the jugular are so comprehensive that one can scarcely imagine a case of pyemia which would not come within their scope.

Macewen* says: "Where the infective thrombus in the sigmoid sinus has undergone such extensive disintegration as is unlikely to be reached by obliteration of the upper two-thirds of the sigmoid sinus the ligature of the internal jugular is indicated. When in a thrombosed internal jugular giving the sensation of a hard cord-like structure its upper part becomes soft from disintegration of the thrombus, and when this is followed by descending disintegration, ligation of the vessel below this point is in most cases necessary. When one can foresee in the outset of the case that the vein requires to be ligatured it had better be done as the first step before clearing out the sigmoid sinus, as greater freedom may then be obtained while performing the latter. In the majority of instances the obliteration of the upper two-thirds of the sigmoid sinus is all that is necessary for the prevention of systemic infection."

Briegert† gives the following figures: "Out of the total of

*Pyogenic Infection of the Brain and the Spinal Cord, pp. 310, 311.

†Brieger, loc. cit., p. 101.

38 cases which I have observed 26 were operated on; in 10 the jugular was tied with five recoveries and in 16 it was not tied with eight recoveries, so that the percentage was the same in both series. A critical examination of the individual cases does not materially alter the result—is, perhaps, a little more unfavorable to ligature.” The important thing must be, not whether a certain number of patients recover without operation on the vein, but whether a certain number of patients die who would have recovered had the operation on the vein been done. Brieger’s recommendations respecting the operation are as follows: “In my judgment the vein is to be exposed as a preliminary measure only in those cases where the diagnosis of primary bulbar thrombosis is possible with special precision; but after the exposure of the sinus the vein should be exposed in the following cases: (1) straightway in immediate combination with the sinus operation only when the infective process cannot be completely commanded by the operation on the sinus, or does not appear to be, by this means; made completely accessible, that is to say—(a) if the cardiac end of the breaking down process cannot be reached through the open sinus; (b) if when the sinus is found normal there exist such local conditions as point, with some degree of certainty, to the presence of jugular thrombosis. Further experience must show whether we are justified in endeavoring to determine the permeability of the jugular by Whiting’s method and by compression of the jugular in the neck, and how far the measures to be adopted should depend on the result of this investigation.” (This method of investigation must be highly dangerous if there is any clot in the vessel.) “2. During the subsequent course of the case (a) if fairly positive signs of the extension of the sinus-thrombosis into the vein should arise; (b) if with a normal sinus, after the evacuation of perisinous abscesses or other foci from which mural thrombi may develop, typical fever and the occurrence of metastases persist. In all these cases the exposure is first the important thing; ligature can be combined with it if the nature of the contents of the vein allows of the immediate slitting up of the exposed portion. Here, again, also, after the exposure of the vessel ligature is to be made dependent

upon local indications arising from the inspection of the exposed vein, from the alteration of its degree of distension by compression and from the examination of its contents by exploratory puncture. I sum up: 1. Sinus phlebitis is always to be treated by operation. The presence even of severe complications or advanced metastases—meningitis, pulmonary abscess with pyopneumothorax—does not exclude the possibility of recovery. 2. The operative treatment must always begin at the primary source of infection. The clearing out of this may suffice to bring about the resolution of a pyemia caused by mural thrombi, and it is in every case indispensable in order to obtain permanent recovery. 3. In the presence of unequivocal symptoms of primary thrombosis of the jugular bulb operation is best done on the jugular and not on the sinus. 4. Ligature of the jugular cannot entirely prevent the occurrence of metastases and is often unsuccessful when carried out as a purely prophylactic measure. 5. It should therefore only be employed upon particular indications.”* It is worth remark that this summary begins: “Sinus phlebitis is always”—it is not the sinus-phlebitis which requires operation, on the vein at all events, but the pyemia.

Preysing,† in relation to the question of ligature of the jugular, divides the principal forms of sinus-phlebitis into three groups (here, again, sinus-phlebitis, not sinus-pyemia): “1. Sinus thrombosis without symptoms—(a) quite fresh clot in the sigmoid sinus or (b) old occluding thrombi consisting of firm granulation tissue such as are commonly first discovered in the course of a temporal bone operation. In both cases ligature should remain undone unless subsequent complications should arise. 2. Cases characterized by clear and definite signs of participation of the jugular in the infection or definite pyemia with metastases. Here ligature should always be done and that before the temporal bone operation. 3. Thrombi in the sinus softened in the centre but firmly shut off on both sides. In these cases ligature should be done if rigors, fever, etc., persist or arise after the

*Brieger, loc. cit., pp. 108-111.

†Verhandlungen der Deutschen Otologischen Gesellschaft, 1901, p. 118.

temporal bone operation has been carried out, but we can wait with a clear conscience when these threatening indications are absent. If ligature must be done in this third group of cases it will naturally follow the mastoid operation; the right may, however, be conceded to every operator, if he believes he has diagnosed this third form of sinus-thrombosis, to carry out the ligature before the trephining." This is in practical agreement when the significance of the last sentence is considered, with the advice I gave when first I wrote on this subject, that operation on the vein should be done when the pyemia is present or is threatened. The cases in Preysing's first group are obviously not pyemia.

In the paper written in 1889,* I said: "The diagnosis having been made there remains for discussion the question of treatment. This must *in all cases* be two-fold—viz., the free exposure and removal of the focus from which pyemic infection has occurred *or is threatened*; and secondly the establishment of a block in the highway along which the infecting agents are traveling from the local focus into the general circulation. . . . With regard to the vein . . . it should certainly be ligatured *in all cases* of thrombosis of the sinus associated with ear disease and though it may not be possible to determine whether a given thrombus be septic or not septic, yet the probabilities are so great that if the thrombus be not already infected it will become so, that it would be fool-hardy in such a case not to ligature the vein" In the same paper I dealt with the question of pyemia arising from the temporal bone without obvious infection of the lateral sinus and I wrote: "Under such circumstances it behoves us to inquire whether surgical interference offers any hope of life to the patient. The answer to this question is, for me at least, an emphatic affirmative. Whether the sinus be full of clot or moving blood it matters not; in either case the poison is being poured into the sinus, or say, through the vein of the cochlea into the jugular; and the method which has proven efficacious in saving life in the one case will assuredly, if promptly applied, be equally successful in

³¹Ballance, loc. cit.

the other. The local disease of mastoid or petrous must be freely exposed and antisepticated with sublimate solution. The vein must be ligatured in the neck and the sinus must be freely exposed in the usual way behind the ear, opened and plugged. Thus an artificial thrombosis of the blood arrested between the plugged sinus and the ligature on the vein will be effected. It will then not be possible for any further infection to happen from the primary source of disease, for the collateral circulation is not sufficient to carry the infective material down the other jugular, as is shown by the histories of the four cases on which I have operated. The whole or the greater part of the clot thus artificially induced would not at first be other than healthy in character, but it might subsequently become infected with micro-organisms, in which event it would be easy to wash it out, especially if the lower end of the upper segment of the vein had been stitched to the margin of the skin wound in the neck. By these means the surgeon may erect an effectual barrier against further pyemic infection from the primary focus, which may at once be successful in arresting the symptoms of danger, or may materially assist a patient in combating the symptoms of acute pyemia until the chronic stage is reached, which, in this disease, is always of hopeful import so far as life is concerned." In a paper written last year for Chipault's international work, "*L'Etat Actuel de la Chirurgie Nerveuse*," as yet unpublished, this position is modified by saying: "Nothing is more striking to those who have had much experience in these cases than the fact that in some the process rests purely local, while in others it rapidly extends in either direction. The pathological conditions being so diverse no absolute rule can be given as to whether or not the internal jugular vein should be tied. The course to be pursued depends upon the condition found. If the suppuration in the vein is localized and the sinus occluded on each side of the area of suppuration, incision of the sinus and drainage suffices for its cure. If, however, infected clot is extending along the course of the jugular vein it is as clearly the duty of the surgeon to operate on that vein as it was his duty to operate on the original disease in the temporal bone; he must, as we have already said, follow the disease to its utmost limits,"

That is to say, in other words, that if when you do the operation the conditions found are such as to make it quite sure that a pure block already exists in the highway you need not make a new one. The principle of the original statement is in no way modified by this concession, since nature has then already done what would otherwise be demanded from art. Körner in reference to this question says: "The cause of the happy result of operations limited to the sinus lies in the fact that the sinus is in most such cases shut off on both sides by solid uninfected thrombi. Again, most such cases are instances of early sinus-thrombosis unexpectedly found in operating for extra-dural abscess, not yet of great extent and but little broken down.....In most cases it cannot be known whether the thrombus has extended into the bulb of the jugular and there broken down, from this situation detachment of particles and their entrance into the blood-current can take place more easily than from the sinus. The ligature of the jugular is *justified* in all cases of sinus-thrombosis and will be *necessary* when the diseased sinus is not firmly occluded on the cardiac side. "The question is more simple if it is known that the thrombus has **extended** to the bulb of the jugular vein itself. Every movement of the head and every manipulation of the neck may cause detachment of particles of clot, and experience teaches us that under these conditions the occurrence of pulmonary metastases is almost constant. All authors agree that here the jugular should be tied and that before the sinus is opened."* "If a considerable flow of ichorous fluid takes place on incision of the sinus," says Jansen,† "it is to be inferred that the septic breaking down process extends to the bulb, and that the bulb, if not already infected, is in immediate danger of becoming so. Under such circumstances the surgeon had best proceed forthwith to the ligature of the jugular." It is impossible, in many a case, to say that there is no reason to fear septic venous infection, and in case of doubt operation on the jugular should be performed.

"To fear the worst is oft to cure the worst."‡

*Körner, op. cit., p. 80.

†Jansen, loc. cit., p. 27.

‡Troilus and Cressida, Act III, Scene 2.

CONCLUSIONS.

1. *Diagnosis of case before or during operation.*—The surgeon, from his examination of the case, must, if possible, come to a clear determination as to the condition from which his patient is suffering—whether (*a*) from an acute systemic infection or (*b*) from a systemic disturbance depending upon a local process. When this can be determined beforehand the plan of operation is clear. If doubt exists as to the exact nature of the case the matter must be cleared up by careful observation at as early a period as possible during the progress of the operation on the temporal bone.

2. *The operation on the vein.*—This should be undertaken (*a*) in acute pyemia and acute septicemia, whether the sinus is occupied by clot or by fluid blood; (*b*) if the sinus wall is gangrenous or its contents are putrefying, unless it is perfectly clear that on both sides of the area of inflammation the lumen of the sinus is completely blocked by non-infected thrombi (how seldom this qualification will be operative will be obvious to those who have most experience of these cases); (*c*) if it is proved, or even suspected, that the blood of the jugular bulb is in part or wholly clotted; and (*d*) if the jugular vein is thrombosed.

It will be seen that, in my opinion, operation on the vein is called for, not only by general systematic infection, but also by certain local conditions. Some observers hold the opinion that the decision of the question as to whether operation on the vein should be carried through depends principally upon the local condition found, while others think that the decision should depend more upon the state of the patient in general and the febrile condition in particular. The right course to adopt is clearly to give due consideration to all the facts.

When it has been decided to deal with the vein before beginning to operate, the operation on the vein should precede that on the temporal bone, and when operation on the vein is first decided upon during the course of the temporal bone operation, it should be forthwith carried through without waiting for the completion of the operation on the sinus region.

The vein when not thrombosed is exposed in the neck about the level of the cricoid cartilage, and the surgeon tying its tributaries and dividing them between two ligatures, should remove it completely up to the bulb. Ablation of the vein is better than ligature. It involves ligature of the tributary veins and as the line of incision involves the external jugular that vessel is also necessarily tied. In cases of thrombosis of the internal jugular the ablation will begin at its junction with the subclavian, and it will be no difficult task in these circumstances to find on its inner side, lying on the scalenus anticus, the vertebral vein and to ligate and divide it also.

Lest it may be said that this is too desperate a measure to recommend I would say that in these cases.

“Strong reasons make strong actions,”*

and

“The only safety lies in the despair of safety.”†

3. *The completion of the operation on the sinus region.*—

Having dealt with the vein the operator returns to the sinus region and removes bone so as to expose the sinus toward the torcular for a distance of at least three-quarters of an inch beyond the area of inflammatory change, and the same treatment is adopted on the other side of the inflamed area, bone being removed in some cases, and probably better in all, as far as the bulb, so that the whole area of possible infection of sinus and vein is exposed in one continuous wound.

In general surgery an extensive septic suppuration is treated by laying the affected area open by one or several incisions, but in those cases in which it is possible to expose the infected tissues by one incision, however long, the best results ensue. If one continuous wound is not made in cases of lateral sinus pyemia the dangerous area of the bulb is not laid open and the presence here of even small particles of putrefying clot may determine an extension of the infective clot along the inferior petrosal sinus to the cavernous sinus, just as when a ligature has been left on the upper segment of the

*King John, Act III., Scene 4.

†Conquest of Mexico, Prescott, Vol. I., p. 351, also, “una illis spes salutis, desperasse de salutis.” P. Martyr de Orbe Nove, Dec. 1st, cap. 1.

jugular a "test-tube of pus" may form in it and produce a similar disastrous effect. The danger of this practice was pointed out in a previous paper.*

Jansen† says that when he has reason to anticipate further suppuration in the sinus thrombus he exposes the sinus for a greater length so as to be able to extend his incision in it without the necessity for a further bone operation. This seems, however, a recommendation which is not sufficiently thorough-going, since if further breaking down of the thrombus is likely to happen further incision of sinus is required at the first operation. It is impossible to deal with the sinus as with the vein, by removal, as this would expose the intra dural space. In acute foul suppuration of other parts of the body we do not curette away the pus and therefore the suggestion frequently found in otological literature, that we should curette away pus or putrefying clot through an opening in the sinus, is one that should be abolished from surgery. The obvious proceeding is to slit up the sinus, if necessary from torcular to bulb, so that the whole area of infective inflammation may be exposed and dressed *secundum artem*.

Brieger‡ says: "No doubt remains as to the measures to be carried out with respect to the sinus. The sinus is to be slit up in the whole extent to which it is thrombosed and the tube of the vessel is to be converted into a groove, freely exposed on its outer aspect by the excision of the entire outer wall, and its contents for this portion of its extent completely removed. The sharp spoon is not a permissible instrument for use in the sinus because, even when immediate injury is avoided, clots may be detached which are serving to shut off from the infected area neighbouring vessels, such as the petrosal sinuses, which are as yet intact. The occurrence of hemorrhage when clearing out the sinus is not, *per se*, a proof that the removal of clot is complete. By the removal of such portions of clot as block the entrance of the petrosal sinuses sharp bleeding may occur in spite of the lateral sinus or the jugular being full of clot,"

*Ballance: Allbut's System of Medicine, loc. cit., p. 603.

†Jansen: Encyclopaedie der Ohrenheilkunde, loc. cit., p. 371.

‡Brieger, loc. cit., p. 94.

4, *Some further considerations.*—1. The radical procedure here described will, in certain cases, no doubt commend itself to all, but, as I have already pointed out, it is in the selection of cases that the judgment of the surgeon must come in. Want of proper perspective in the selection of the operation suitable to a particular case is well illustrated by the following instance: "The two practitioners in attendance had already chiselled away the mastoid a few days after the commencement of the pains in the ear, and that as far as the posterior border of its apex, for they had mistaken the posterior border of the mastoid for the linea temporalis. As they had found no pus and as the violent pain persisted and the fever was still higher after the operation in their perplexity they sought my help. I incised a boil which completely occluded the meatus, whereupon fever and pain immediately ceased. The unnecessary wound in the mastoid healed in three weeks."* No one would use such a case as an argument against complete removal of all disease in the temporal bone; and no one I trust, would select the operation I have just described on the sinus and vein for the relief of a local process in the temporal bone. In dealing with a case our measures must correspond to the actual condition from which the patient is suffering.

2. It has already been shown that the surgical treatment should be the same whether the disease has had its origin in an acute or in a chronic inflammation and that the dealing with the inflamed sinus and the inflamed vein in a manner comparable to the proper surgical treatment of acute inflammation in other parts of the body by free incision or ablation is not only not dangerous but highly beneficial and curative.

3. In all great operations, speed is an essential factor. In such an operation as I have described rapidity of skilled execution is as urgently needed as in general septic peritonitis from perforation or as in hemorrhage from rupture of the spleen or the rupture of a tubal pregnancy. As germane to the subject of despatch in operating I may quote from a writer who in criticising an operation which had been needlessly prolonged says: "Such slowness is no result of justi-

*Koerner: Die Eitrigen Erkrankungen des Schlaefenbeins, p.50.

flable caution but shows want of dexterity and imperfect knowledge of the operation region and the want of self-confidence arising therefrom."*

To sum up, may I again emphasise the fact that I am profoundly convinced of the value of arresting the current of venous blood which flows from the infected area. I strongly urge its curative value, its imitation of the processes of nature, its harmlessness as an operative procedure, and its foundation on a true appreciation and knowledge of pathology. It does not appear to me to be a moot question of surgical detail but is in accord with fundamental surgical practice. The risk in leaving the vein unoccluded must not be run.

Chronic Suppuration in the Middle Ear; Thrombosis of the Lateral Sinus; General Septic Infection; Operation; Venous Transfusion; Recovery.†

W. M. WILLIS. (*Lancet*, June 14, 1903.) Chronic suppuration in the middle ear is an extremely common disease and in view of the serious complications which sometimes ensue in consequence of its persistence it is well deserving of consideration and adequate treatment. However the inflammation originates, its persistence is to be found in the fact that inefficient drainage exists and this arises from several causes. There is an anatomical cause, which is a bar to efficient drainage in the case of suppuration within the tympanic cavity, inasmuch as that portion known as the attic is a sort of natural reservoir the floor of which is on a higher level than that of the floor of the general cavity of the tympanum and discharge from this portion will only occur by overflow. It is common for the inflammatory process to involve the mastoid and here we have isolated cells which communicate with the general tympanic cavity through the largest of them known as the antrum. But the communication of the antrum with the tympanum is reduced in disease, so that efficient drainage is easily impaired. Thus from these causes we have

*Koerner: Op. cit. p. 18.

†A paper read before the Nottingham Medico-Chirurgical Society on Jan. 21st, 1903.

a collection, varying slightly in amount from time to time, but always more or less existing, of what may be termed residual pus and this is present under a certain amount of pressure or tension.

In addition to the foregoing there is a pathological reason why efficient discharge is prevented and this is to be found in the presence of granulation tissue which is present in varying quantity both within the tympanum and on the outer side of the perforation in the tympanic membrane, through which the pent-up matter originally made its escape and from which it has continued to issue. Two facts have so often presented themselves to me that I believe them to be true. The first is that the disease in question is eminently curable if free drainage is established and maintained, and the second is that by reason of the long time some of these cases are allowed to persist either they must be looked upon with apathy or indifference or inadequately treated. If the bar to efficient drainage found in the granulations before alluded to be removed by treatment directed through the meatus, and the aperture in the tympanic membrane be enlarged, and subsequently the tympanum be kept surgically clean, the patients in many of these cases will quickly get quite well. Some, however, will not and more extensive measures will be required. For these, when the less severe methods have been thoroughly tried and failed, the operation of opening the mastoid antrum or that known as complete mastoidectomy will need to be performed. This can be urged with much confidence as a cure can be promised and the mortality *per se* may be disregarded.

Cases will have to be decided upon on their own merits. In some an operation on the lines of that originally devised by Schwartze will be adequate but in others the more extensive proceedings practised and described by Stacke will be needed. In either operation it is necessary to have an accurate knowledge of the anatomic structure of the parts and to exercise an abundant care in the steps of the operations, but provided these conditions can be complied with then the operations are reasonable safe and will afford good results. There will be careful and patient subsequent treatment necessary oftentimes, but in the end a cure will be effected.

These preliminary observations on chronic suppuration in the middle ear serve as a preface to the description of a case recently under my care, in which prolonged suppuration was followed by thrombosis of the lateral sinus, extending into the jugular vein, and subsequently by general septic infection as evidenced by signs of inflammation in the lung and effusion of fluid into the pleural cavity and repeated rigors.

The patient, a male, aged 19 years, was admitted into the Nottingham General Hospital on Oct. 11th, 1902. He complained of pain in the head and gave the following history. There had been a discharge of matter from the right ear for nine years, it having followed an attack of scarlet fever. One week before admission he was seized with sudden illness and suffered from shiverings, vomiting, and intense pain in the head. Coincidentally, he stated, the discharge from the ear ceased. His condition on admission was as follows: The temperature was 102.8° F. He had pain in the head, especially on the right side, stiffness and tenderness of the muscles of the back of the neck, and some retraction of the head. There was an indistinct fulness to be felt in the neck high up just below the mastoid process. He was under the care of Mr. Joseph Thompson at this time who in view of the patient describing himself as feeling better, and as the temperature was falling, and there being no urgent symptoms, decided to watch the case for a time. His condition remained much as above described until Oct. 18th, when, for the first time since admission, he had a rigor which lasted for 20 minutes and the temperature rose to 105.2° .

On Oct. 19th Mr. Thompson, being unable to attend, asked me to see the patient and I then learnt the fact of the rigor on the evening of the 18th and found that during the time he had been in the hospital, whilst there had been no rigors other than that mentioned, yet there had been an extremely oscillating temperature.

In addition to the temperature there were present headache, purulent discharge from the right ear, tenderness and stiffness of the muscles of the back of the neck, and a fullness down the upper half of the anterior border on the right side. There was no optic neuritis.

I formed the opinion that he had a thrombosed lateral sinus and operated on the same morning. I first turned down a semilunar flap about two inches in diameter, one side of the incision falling just behind the pinna and the other nearer the occipital protuberance. Baring the bone and drawing the pinna well forward I defined the bony margin of the external auditory meatus. I then opened the mastoid antrum and cleared out a small quantity of inspissated pus which it contained. The next step consisted of trephining over the lateral sinus, exposing it by the removal of a half-inch disc of bone. An incision into the sinus revealed the fact that it was full of clot. Leaving the skull I now turned to the neck and exposed the lateral jugular vein and found that the thrombus extended low down into this. I therefore ligatured it as low down as possible but could not get below the clot, and excised some one and a half inches of the vein above the ligature. Returning to the skull I slit open the sinus and removed the clot and syringed through with sterilized water from the sinus to the jugular vein exposed in the neck, washing out thereby all the contained clot. Bleeding now became free both from the sinus and the jugular vein. The latter was therefore ligatured and the former was plugged with gauze, the hemorrhage being thus easily controlled. The skull flap was then stitched into position, gauze plugs being in the sinus and in the mastoid antrum, the ends of those issuing from the respective angles of the wound. The wound in the neck was then closed, and here I may say that this was a mistake, as it suppurated later and had to be completely undone; no harm, however, ensued.

By this complete operation I succeeded in removing nearly the whole of the septic clot, and in addition cut off the main supply of septic material from entering the general circulation. I therefore looked for a cessation of the symptoms which had previously existed and hoped for an uninterrupted recovery. But in this I was disappointed. The operation was performed on Oct. 19th and without giving the detailed notes taken from day to day suffice it to say that his symptoms continued. He had repeated rigors and high temperatures. In the intervals of the rigors he felt fairly well but extremely weak.

On Oct. 25th my note says: "Breathing seems a little labored; crepitations to be heard at the third left rib in front and impaired resonance at the left base." The physical signs remained thus for the next day or two and the rigors were repeated. I therefore resolved to adopt a method which I have not seen described as having been employed for the treatment of undoubted general septic infection.

I think there can be no doubt that it was a case of true septic infection as distinct from septic intoxication—i. e., septicemia as against sapremia—this view being supported by the fact that the main part, if not the entire supply of septic material had been cut off, in spite of which the constitutional symptoms persisted and the condition in the lungs above described supervened. His only hope of recovery I considered lay in an increase in his power of eliminating the poison with which he was saturated, and this I thought I could effect for him by large y diluting his blood. On Oct. 30th I therefore admitted into his right median basilic vein three pints of normal saline solution and one ounce of brandy. On Nov. 2nd my note says: "Has had no rigor for several days and there has certainly been an improvement in his condition ever since the transfusion."

"There are some dulness at the left base and a diminution of breath sounds and vocal resonance." On the 3rd I opened the median basilic vein of the left arm and removed nearly one pint of blood; I then transfused him with another three pints of normal saline solution and one ounce brandy. On the 10th my note states: "He has improved immensely since the last transfusion. For the last three days his temperature has been practically normal."

On the 3rd the second transfusion took place and the temperature did not finally reach normal until the 7th, but in the intervening four days it was lower on the average and the elevations were not so great when they did occur. The chart for these days suggests a final flicker of the disease. The quantity of urine excreted subsequently to the transfusions did not show any great increase, though it was a little more, but there was marked sweating, his garments being frequently changed when wet through. It was in this way, possibly, that he eliminated toxic elements.

His final recovery was now uninterrupted and he is at the present time perfectly well and was shown at a meeting of the Nottingham Medico-Chirurgical Society on Jan. 21st, when this account of the case was read.

In conclusion, I would say that this short paper does not presume to be an elaborate account of the treatment of chronic suppuration in the middle ear, but merely expresses the opinion that that disease is eminently curable, and in view of its complications, should be cured. Secondly, in a brief and imperfect manner the lines on which such treatment should be carried out are suggested and outlined. Finally, in respect of the thrombosed lateral sinus, the operation described is in no way novel, but is the method very frequently adopted. In regard to the history of the case, however, subsequent to the operation, the evidence which the case affords seems to me to warrant the opinion that the patient's life was saved, when he would otherwise have died from septicemia, by the transfusions which were performed, and I venture to submit this for publication as I have not seen a similar case recorded.

II.—NOSE AND NASO-PHARYNX.

Chronic Sphenoidal Suppuration.

McKEOWN. (*Lancet*, Aug. 2, 1902.) Some observations as to treatment.

Rodent Ulcer of Nose and Eyelids.

TAYLOR. (*Lancet*, May 17, 1902.) Report of a case satisfactorily treated by x-rays.

Nasal Vertigo Simulating Epilepsy.

WOAKES, (*Lancet*, Aug. 16, 1902.) A man aged 60, suffered with "epileptiform seizures," which were relieved by removal of left middle turbinal body which was in close contact with septum. Later on (4 years) symptoms returned, and both middle turbinals were removed, with relief.

Use of the Naso-Pharyngeal Tube for Prolonged Nitrous Oxide Anesthesia.

HILLIARD. (*Lancet*, June 28, 1902, and May, 1895.) The author maintains that it is a successful method of prolonging gas anesthesia in mouth operations.

The Uses of Suprarenal Extract in Nose and Throat Diseases.

B. DOUGLASS. (*N. Y. Med. Journal*, May 2, 1903.) The author reviews in a general way the uses of suprarenal extract, giving largely the results of his own experience.

Next to adrenalin chlorid he prefers for use in the nose and throat a 6 per cent. solution of the gland in freshly boiled water. He believes that all antiseptics used in the solution tend to weaken its activity. He mixes his adrenalin with cocain for local use, using 20 minims of the former, 1-1000, in a half ounce of 4 per cent. of cocain, or 1-500 of the adrenalin to a 7 per cent. solution of cocain for work on the septum.

Douglass no longer believes the hemorrhages which follow its use are due to its secondary effects. He has, however, met such cases, and so, after any nasal operation, introduces strings of iodiform gauze or Bernays' sponges. For septal work he introduces hypodermically a solution of 30 grains of suprarenal to 1 ounce of water, with 10 grains of sodium chlorid and 5 grains of eucain added after filtration, and 5 grains of cocain just at time of use. This makes a 1 per cent. solution of cocain—6 minims are usually sufficient. Certain unpleasant results are noted—among them dryness of throat and nose, change in character of nasal secretions, sense of shrinking of nasal membrane, tickling, headache, etc. He is of the opinion its use delays healing. Of the uses noted emphasis is laid on its value in acute inflammatory disorders, and also as a temporary help in malignant disease of the nose.

Harris.

On the Duplicity of the Accessory Sinuses of the Nose.

BRUEHL, Berlin. (*Archives of Otology*, Vol. XXXII, No. 2.) Two cavities instead of one are frequently encountered in the frontal sinus, in the sphenoidal sinus and more

rarely in the maxillary antrum. Anatomical investigation has shown that in most cases this is due to ethmoidal cells which have extended to the frontal bone, the sphenoid bone and the superior maxilla. In the maxilla dentigerous cysts occasionally produce the additional cavities.

A true duplication of the accessory sinus due to a division of the rudimentary condition is extremely rare.

Campbell.

Osteomyelitis of the Skull With Empyema of the Nasal Accessory Cavities, Sinus Thrombosis; Pyemia; Death; Autopsy.

ARNOLD KNAPP, New York. (*Archives of Otology*, Vol. XXXII, No. 3.) A woman aged 21 had for 5 years nasal occlusion and purulent discharge. The nose slowly broadened out, producing the typical frog face. Polypi filled the upper nasal cavities, but examination of these and adjacent bone showed only ordinary inflammatory changes. Antisyphilitic treatment was ineffectual. The inner orbital walls were removed, the frontal sinuses were opened, but a low-grade osteomyelitis spread upward and backward over the frontal eminences to the coronal suture and into the temporal fossae.

The temperature now rose abruptly, the right sub-occipital area became indurated. Involvement of the sigmoid sinus was suspected, and on exploration an epidural abscess was found situated over the upper knee of the sigmoid sinus. The sinus was filled with a thrombus and was completely evacuated. Pyemic infection developed in the lungs. Optic neuritis with hemorrhages was present and the patient died rather suddenly.

On autopsy the inner surface of the left frontal bone was honey-combed, and the underlying dura was covered with small granulations. The ventricles were filled with a turbid fluid and the torcular contained a purulent thrombus. Thrombi were present in the bulb and jugular vein. The sphenoidal and maxillary sinuses contained pus.

Campbell.

A Case of Rapid Destruction of the Nasal Septum, Probably Lupus, in a Male aged Thirty-four.

DR. WYATT WINGRAVE. (*Journal of Laryngol.*, July,

1903. *Laryngological Soc. of London.*) The patient, a well-nourished male, a plumber, complained of a sore nose of six months' duration. It commenced as a sore spot just inside the nostril, which soon became a hole, and, melting away like glue, ate its way to the lip. He was in the habit of picking it freely and pulling out hairs. There was now complete loss of septum from before backward, as far as the posterior limit of the vestibule, with nodular ulceration of the upper lip on the site of the philtrum, more or less covered with crusts. He gave no history of syphilis or tubercle. The gums were healthy, but he had some copper-colored spots on the forehead. He had been married twelve years and had four healthy children. His wife had no miscarriages. There was a submental enlarged gland.

Dr. Grant said that the columella of the nose was eaten away entirely by a curious circumscribed ulcer. Had any member seen a similar case? It was very difficult to decide whether it was a case of primary syphilis, or of tuberculosis, or of epithelioma.

New Method of Treating Epistaxis.

HUNTER MACKENZIE. (*Brit. Med. Jour.*, Sept. 1902.)

Male, aged 49, bled freely from a point on the anterior third of the nasal septum. Galvano cautery, cocain, adrenalin and other measures failing to stop the flow after three days, the mucous membrane of the septum corresponding to the source of bleeding was snipped off by means of a nasal spoon and curette. This proved effective. The author deprecates plugging of post nares.

III.—MOUTH AND PHARYNX.

The Therapeutics of the Pine Apple.

WYATT WINGRAVE. (*Lancet*, June 23, 1903.) Draws attention to the powerful proteolytic action of its ferment, its application in keratosis of tonsils, diphtheria, etc.

The Influence of Nasal Obstructions Upon the Development of the Teeth and Palate.

WYATT WINGRAVE. (*Brit. Med. Jour.*, Aug. 16, 1902.)

The view that an obstruction directly influences the development of the teeth, and is the cause of gothic arched palate is not accepted by the writer. He suggests that this interpretation is to be found in a premature ossification of the interpalatal, inter-maxillary and vomerine sutures, so that the ethmo-vomerine element—the septum—becomes crowded and distorted in the absence of sufficient vertical room for its development.

The result is a high vault to the hard palate, small, undeveloped maxillary sinuses and small nostrils, red with the inevitable mouth breathing.

The Diagnosis and Treatment of Malignant Stricture of the Esophagus.

SYMONDS. (*Pol. Lar. Soc. of Lon.*, July, 1902, Vol. IX.) Classified according to situation. Treatment was summarized:

1. Cricoid—Long rubber tube or gastrostomy early.
2. Central.—Short tube.
3. Cardiac Orifice.—Gastrostomy.

Chronic Hypertrophy of the Faucial and Pharyngeal Symphoid Tissues.

MARSH. (*Lancet*, June 21, 1903.) A historical and surgical survey.

Death After the Removal of Tonsils and Adenoids in Hemophilic Child.

STEWART. (*Lancet*, Nov. 15, 1902.) Boy aet. 7 years had tonsils and adenoid removed under ether. Hemorrhage free at the time but stopped. Two hours later blood extravasation rapidly took place into both sides of neck and subcutaneously without bleeding into mouth or naso pharynx. Intubation, tracheotomy and death resulted thirty-two hours after operation.

Necropsy showed no large thymus. There was no history of hemophilia.

Arrest of Hemorrhage From the Tonsils by Suture of the Faucial Pillars.

LAMB. (Short article in *Brit. Med. Jour.*, Nov. 15, 1902.,

quoting Escort.) The hemorrhage was very severe after removing tonsils in "un morcellement." The pillars were drawn together by two sutures passed by a staphylorrhaphy needle holder, a cylindrical tampon of cotton wool being included between them.

(As bleeding rarely occurs from the tonsils stump, but from the anterior pillars, Baum's method is of great service.—Abstractor.)

Wyatt Wingrave.

Functions of the Epiglottis.

RENSHAW. (*Brit. Med. Jour.*, July, 1902.) Concludes that it has no important action in deglutition, beyond that of a slight lateral protection of the glottis. That its main function is to prevent the secretions of the upper air passages from entering the larynx when in a state of rest. That its influence over phonation is at present undetermined.

Wyatt Wingrave.

Primary Gangrene of the Tonsils.

ROBT. FULLERTON. (*Lancet*, June 7, 1902.) Relates 2 cases of slough occurring in tonsils following acute lacunar tonsillitis. They differed from the "acute ulcerative tonsillitis" of Moure in the presence of constitutional phenomena surrounding infiltration and the micro-organisms present were staphylococci, diplococci and later pneumococci.

One of the patients died nine months later of acute tuberculosis.

Wyatt Wingrave.

IV.—LARYNX.

Bilateral Adductor Paralysis in a Boy Aged Seven Years.

WINGRAVE. (*Lancet*, July 26, 1902.) Case shown at Brit. Lar. and Rhin. Assoc. Aphonia had persisted for four years; there were no adenoids, and voice was permanently restored with one application of the interrupted current. It was regarded as hysterical.

Congenital Papillomata of the Larynx in a Female Aged Twenty-Three.

GRANT. (*Lancet*, July 26, 1902.) Case shown at the Brit.

Lar. Rhin. Assoc. The patient had worn tracheotomy tubes since infancy, growths removed with forceps and snare. Tracheal wound closed, complete recovery of voice.

Functions of the Epiglottis.

CLINCH. (*Brit. Med. Jour.*, Aug. 2, 1902), Reference to its position in young marsupials.

RENSHAW (*Brit. Med. Jour.*, July, 1902) concludes that the main function is to prevent the secretions of the upper air passages from entering the larynx when in a state of rest. That during deglutition it acts as a slight lateral protection to the glottis.

The Operative Treatment of Stenosis of the Larynx Following Intubation and Tracheotomy. Report and Exhibition of the Cases.

ARTHUR B. DUEL. (*N. Y. Med. Jour.*, May 2, 1903.) A valuable contribution to a difficult field of surgery. "One per cent. of cases intubated for acute stenosis are found to require continued intubation or tracheotomy thereafter."

"The cause of the retention is due in the majority of cases to chronic inflammation of the interlaryngeal mucous membrane and hypertrophy of the subglottic tissues and not as has been generally supposed, the result of granulation ulceration on cicatricial bands "

"Auto-extubation is the rule and adds greatly to the danger. As a result a large number of such cases are tracheotomized for safety, where high tracheotomies are done cicatricial bands are almost certain to form in the trachea or lower part of the larynx above the tracheotomy wound."

Duel advises in the treatment to introduce the largest size tube possible under an anesthetic. This tube should be specially constructed, the construction below the neck being only 1/32 of an inch smaller than the retaining sweli. This tube should be left undisturbed for at least six weeks. He believes that where auto-extubation frequently occurs, it is better to split the larynx and retain the tube by a clamp, rather than resort to a tracheotomy. Where it is impossible to dilate the larynx, it will be necessary to perform a thyrectomy as in the three cases reported, and the special tube then introduced.

Harris.

The Treatment of Early Cancer of the Larynx by Thyrotomy.

EUGENE S. YONGE. (*Lancet*, Nov. 15, 1902.) If it were desired to apply Emerson's doctrine of "compensation" to the condition of cancer as it affects the larynx—granting that any indemnity can be conceived for so serious an affection—one might perhaps discover an application of it in the favorable position—from an operative point of view—which malignant disease generally occupies in that organ and in its usual course and progress there. In the majority of instances epithelioma (which is the form of malignant disease to which I more particularly refer) is at first *intrinsic*—that is it takes origin from a vocal cord or ventricular band and is confined, often for a considerable period, within the laryngeal cavity, where its possibilities for evil are for the time limited and in a sense parochial. The larynx during this period regards the new growth with considerable tolerance, and the growth it self acting, as it were, on the principle *volenti non fit injuria*, betrays a great reluctance to invade and to penetrate the cartilage of the structure and spreads by preference upwards toward the superior aperture, thus eventually becoming *extrinsic*, or downward toward the trachea. Moreover, commonly, but not universally, involvement of the lymphatic glands is absent or very late in making its appearance; and so long as the disease remains intrinsic the lymphatic glands do not as a rule receive their quota of infected material. The reason of this peculiar exclusiveness of the intrinsic growths is still matter for conjecture; but whatever the cause may be, whatever factors may coöperate to produce the so-called "isolation" of the larynx, the clinical fact is well known that intra-mural neoplasms are thereby rendered more amenable to successful surgical interference than they would otherwise be. The importance of recognizing the disease at this early stage, when the mischief is still purely local, is of course very great. It is at this time that the comparatively simple procedure of thyrotomy with excision of the diseased structure (including, if necessary, cartilage) is capable of application and is likely to be followed, as pointed out by Semon,* Butlin, Chiari, Schmiegelow, Tilley, and others, by

*Sir Felix Semon has recently informed me that the proportion of cures which he has obtained by thyrotomy in these cases is now nearly 90 per cent. Also vide *The Lancet*, August 11th, 1900, p. 1113

such brilliant results, And these results are not confined to the radical extirpation of the disease and the prevention of its recurrence, but extend in many instances to a marked restitution of the vocal powers. Furthermore the risks and disadvantages associated with total or partial laryngectomy are to a large extent avoided. I mention immediately below two cases of epithelioma upon which I operated by this method more than a year ago and which are still free from any sign of recurrence.

CASE 1.—A man, aged 57 years, consulted me for hoarseness of about 12 months' duration. On laryngoscopic examination the left cord was found to have been transformed into a papillary fringe; it moved less freely than the corresponding cord which was hyperemic but otherwise appeared normal. No enlarged cervical glands could be felt. A portion of the growth was removed with Schrötter's tube forceps and pronounced, after microscopic examination, to be squamous epithelioma. On July 29th, 1901, I performed tracheotomy, cutting through the isthmus of the thyroid gland and inserting the tube in the trachea between the two halves of the isthmus. On August 6th the larynx was opened by splitting the thyroid cartilage in the middle line. A sponge was inserted above the tracheotomy tube, which was an ordinary one of large size, and cocain was then applied to the interior of the larynx on the affected side in order to limit the hemorrhage and to enable the extent of the disease to be as far as possible defined. The left cord was excised together with a portion of the left ventricular band and arytenoid cartilage. The cartilage and soft parts in this area were thoroughly scraped and, after drying, were painted with iodoform varnish and the larynx and the external wound were closed. The tracheotomy tube was removed in 24 hours. The patient was aphonic for a few weeks after the operation but gradually developed a strong and fairly clear voice, owing principally to the formation of a fibrous band in the position of the vocal cord which acted vicariously for that structure. His voice is now much better than it was before the operation, in spite of the structures removed. At the request of his family he has attempted to sing, but I understand that the result of the effort was not melodious. At the present date, one year and

three months after the operation, there is no sign of recurrence.

Dr. S. Delepine, professor of pathology at the Owens College, Manchester, has kindly made a very complete examination of the structures removed and his report is subjoined: "The tumor is a typical lobulated epithelioma. The section shows that the stratified squamous epithelium normally lining the true vocal cord has grown in the form of lobulated branched processes which have almost entirely replaced the connective tissue between the epithelium and the subjacent cartilage and thyro-arytenoid muscle. These lobulated projections form an almost continuous stratum of epithelium which at places is not less than 30 times the thickness of the normal epithelium. The deepest cell nests are in contact with the perichondrium of the vocal process of the arytenoid cartilage; they have also reached the inner portions of the thyro-arytenoid muscle which is partly atrophied and replaced by fibrous tissue. It is impossible to find any distinct tract of elastic fibre corresponding to the edge of the thyro-arytenoid ligament. The tumor has undoubtedly invaded structures subjacent to the epithelium and has all the characters of a malignant epithelioma."

CASE 2.—A man, aged 67 years, was sent to me for hoarseness which was said to have lasted about 18 months and which had resisted all treatment. There was a wartlike growth with a broad base which was attached to the right vocal cord and ventricular band. The right cord was almost fixed; the left cord showed evidences of congestion in its anterior half but otherwise appeared to be normal. Tracheotomy and thyrotomy were performed at the same operation on Sept. 2nd, 1901. The growth was somewhat more extensive than it had appeared to be on laryngoscopic examination, but the diseased structures were removed and the parts were scraped as in case 1. I employed a Hahn's tube in this instance and did not remove it until about six hours after the operation. For two days there were a considerable amount of coughing and some expectoration of blood, but after that the patient improved rapidly and made a good recovery. At the present time—one year and two months after the operation—he is in good health and remains

free from any sign of recurrence. The voice is not so strong as that of the previous patient, but is quite a satisfactory one.

Professor Delepine reports on this case as follows: "The characters of this tumor are very much the same as those of the above (Case 1). The thickening of the epithelial stratum is, however, less marked. The cell nests are smaller and separated by wider tracts of connective tissue. The cell-nests have, however, penetrated even deeper than in the previous case. The thyro-arytenoid muscle is more atrophied, the increase of interstitial tissue being considerable (interstitial chronic myositis). The cartilage is in a more advanced state of fibrous change (metaplasia), and although the growth seems to have been slower the evidences of malignancy in the tumor are even more evident than in the first case."

At the operations in both cases I had the advantage of the assistance of Mr. A. Wilson, senior anesthetist to the Manchester Royal Infirmary, and of Mr. F. H. Westmacott, aural surgeon to the Manchester Children's Hospital.

The most characteristic symptom of early malignant disease is, I think, undoubtedly a persistent dry hoarseness, especially if occurring in a person over 50 years of age. Pain on swallowing, glandular enlargement, bloodspitting, cachexia, and other symptoms indicative of the later stages of epithelioma of the larynx are generally to be regarded rather in the light of contra-indications to the operation under discussion. Hoarseness in laryngeal cases being only an effect, the discovery of the cause will in the majority of instances suggest a successful line of treatment. In malignant disease, on the other hand, the usual remedies are resisted and the intensity of the hoarseness is often found to be out of proportion to the physical signs which are to be observed by means of laryngoscopic examination. In such cases the removal of a piece of the suspected growth for microscopic examination may be advisable. It is, I believe, important that the piece removed should not be too minute but that the instrument should bite well into the tissues in order that the deeper structures may be capable of being examined. The appearances seen in the larynx are, in my experience, somewhat various. A distinct infiltrating growth may be present or a wart-like tumour be

the chief evidence of disease or the cord may be converted into a papillary fringe as in case 1. A suggestive and early sign, as pointed out by Semon, is a sluggishness in the movements of one or other cord not amounting to paralysis of the structure. The extension of a growth backward so as to implicate the arytenoid region is also a suspicious sign.

The radical nature of thyrotomy, carried out as described above seems, on the evidence of published records, to have been abundantly proved. In the comparative simplicity of the operation, in the small danger to life which it involves, and in the absence of liability to be followed by recurrence the procedure presents a decided contrast to some of the severe methods which in the past have too often been weighed in the balance and found wanting. Indeed in suitable cases the disadvantages of thyrotomy are so inconsiderable in proportion to the excellent results obtained that one is almost justified in saying of it, in the words of Schiller, "Kurz ist der Schmerz und ewig ist die Freude" (The pain is short—the joy is forever.)

V.—MISCELLANEOUS.

The Diagnosis and Treatment of Hereditary Syphilis.

E. H. GRIFFIN. (*N. Y. Med. Jour.*, March 14, 1903.) Hereditary syphilis is often overlooked or diagnosed as scrofula or tuberculosis. This is due to the false impression that Hutchinson's teeth are present in all cases. This is true in only 10-15 per cent. of the cases. Faulty examination of the buccal cavity is also responsible. All cases are curable by proper treatment. He does not remove dead bone in the nose at once, but allows it to remain "to serve as a shelf for new cells to form on."
Harris.

A Critical Review of Some of the Recent Literature of Tuberculosis.

J. WRIGHT. (*N. Y. Med. Jour.* Feb. 21, 1903.) The author in his usual clear style passes in review the more im-

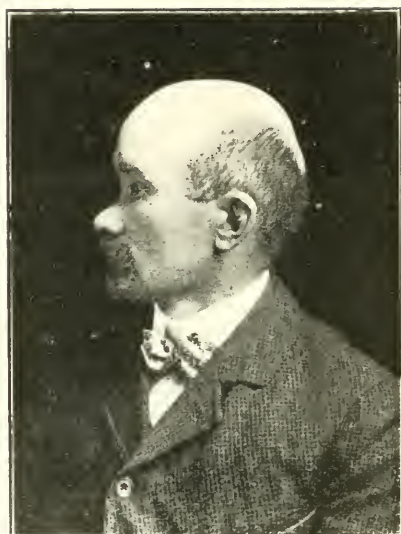
portant recent literature on this subject. He believes with Saenger that the tubercle bacilli cannot enter the alveoli of the lungs by the inspiratory air current. They reach the lungs "through the blood or by lymph vessels into which they enter either directly through the surface epithelium of the upper air tract or from lymph nodes and other foci of infection or lodgment." He regards the assertions of Koch essentially confirmed that the transmission of animal tuberculosis to man does not take place. The papers of Massie and Donelson on tracheal hemorrhage are commented on to emphasize the latter's contention that many cases reported as cured tuberculosis, where the diagnosis was based on hemoptysis alone, were in fact cases of tracheal hemorrhage. In considering Veiss's paper on the curability of pharyngeal tuberculosis, Wright calls attention to the fact that pharyngeal involvement is extremely rare in the early stages of tuberculosis.

Remembering its vulnerable situation, whether we regard the mode of infection through the air or by means of the blood and lymphatics, the great rarity of involvement as compared with the larynx or lungs would forcibly suggest a peculiar form of local immunity. He agrees with Schmidt and Gleitsman that tubercular lesions are cured here more easily than elsewhere. This can be explained on account of the situation alone. At the same time the report of such cases as those of Veiss is not entirely conclusive, who reports four healed cases under use of tri-chlor-acetic acid, for the tubercle bacillus was not discovered in any, and only in one was a microscopic examination made.

The paper deserves to be read in extenso.

Harris.





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XLVI.

PARAFFIN PROSTHESIS.

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When in May, 1899, by injecting melted paraffin into the scrotum of an emasculated young man, the masses appeared so like testicles that the applicant was enabled to pass a medical examination as to fitness for military duty, *Gesung Zeit. für Heilk.*, 1900, established a new era in prosthetic surgery.

He suggested that it might be used to raise the cheek after removal of the upper jaw, to fill a cavity in bone after operations for necrosis, to obtain a movable joint after resection to fill the defect in a trephined skull, to support the weight of the blood in varicose veins by making a firm swelling of paraffin around the vein, to cure incontinence of feces or incontinence of urine in the female by injecting paraffin under the prolapsed mucous membrane, to keep back a

hernia, to fill out the flatness of the chest after breast operations.

It has further been used to fill depressions after frontal sinus and mastoid operations.

To raise sunken cicatrices on the face, the result of tooth suppurations in the lower jaw, to make a foundation for an artificial eye, to prevent regeneration of nerves after resection, to raise mucous membrane over shrunken inferior turbinated bodies in *ozena*.

And above all to improve the appearance of depressed noses.

Dangers in the use of paraffin are due to faulty technic. Thoroughly aseptic precautions must be taken.

Embolism has followed the injection of paraffin into a vein. This first happened to Pfannenstiel, *Centralblatt für Gynak.* 1902, who injected 30 ccm. of paraffin, having a melting point of 115° F. into the loose cellular tissue of a woman suffering from bladder prolapse. She was sent directly to the railway station, and on the way, had a pulmonary embolism with the characteristic symptoms of cough, increased respiration, dyspnea and cyanosis. After suffering for a week the trouble gradually subsided. Hurd and Holden, *Medical Record*, July 11, 1903, report a case of embolism of the central artery of the retina following paraffin injection into the nose. It puzzles one to understand how an embolus could get from a systemic vein into the central artery of the retina without being caught in the capillaries of the pulmonary circulation.

During the injection the patient suddenly began to rub his right eye and complained that he could not see with that eye. A little later ecchymosis appeared about the tip of the nose, indicating that a vein had been punctured. Examination of the eyes 25 minutes after the injection showed the pupil of the right eye large and not responsive to light. The patient had a subjective sense of objects swimming about in the entire field of vision but objectively he was unable to distinguish between light and darkness. The media were clear, the retina not hazy and the retinal veins normal. The main inferior branch of the central artery of the retina and its divisions were empty and collapsed. The main superior

branch contained some blood, but when gentle pressure was made upon the eyeball the blood column here broke up and the blood flowed back into the central artery. Digitalis and amyl nitrite were given at once. Repeated and continued attempts were made by massage to force the embolus forward into one of the branches of the central artery, so as to restore vision to part of the field, but without success. There was no subsequent improvement in vision. Abscess has resulted from injection or hyperinjection.

In the only case that has come under my observation, a brother rhinologist injected paraffin through the mucous membrane to raise the skin of a depressed nose. Suppuration followed and most of the paraffin escaped but sufficient inflammation ensued to leave a fair result.

Undue spreading of paraffin while injecting for improvement of saddle-back nose can be avoided by the assistant's making strong lateral pressure with an index finger placed on either side of the dorsum of the nose as high as the inner canthi, while the operator makes pressure just above the point where he wishes the skin to be raised.

In case of paraffin being misplaced, one must remove it by surgical means. In one such case I tried to soften the mass by extreme heat and then aspirate, but I had to resort to a curette to get it away.

WHAT BECOMES OF THE PARAFFIN?

It is probable that the very hard paraffin, such as that used by Eckstein, which has a melting point of 136° F. becomes encapsuled, while those with a melting point of 104° to 115° F. very slowly become permeated with leucocytes and tissue cells are replaced by fibrous tissue.

When paraffin is being injected the overlying skin becomes much blanched, but reaction soon sets in, and the part becomes reddened by dilatation of the superficial vessels. This redness corresponds to the tension to which the overlying skin is subjected and it may persist from a few hours to many months.

It has been suggested in a condition such as this, that, inasmuch as the x-ray will blanch unsightly red scars by

producing a hyperplasia of the connective tissue cells, which squeezes the blood out of the vessels, that it should cause a speedy disappearance of paraffin erythema.

PREPARATION OF THE PARAFFIN.

The paraffin which I have used has a melting point of 112° F. The ordinary paraffin of commerce has a melting point of about 128° F., and roughly speaking 4 parts of such paraffin to which are added 5 parts of albolene give a mechanical mixture having a melting point of about 112° F. This is placed in a test tube, thoroughly sterilized and laid aside till required.

INJECTION PROCEDURE.

Any steel-barreled, solid-piston hypodermic syringe with a large calibre needle (serum needle) will do. It is preferable, however, to have a coarse screw worm on the piston rod, so that the semi-solid paraffin can be slowly and steadily ejected. The syringe is boiled, the paraffin is melted in a water-bath and the field of operation prepared by scrubbing with green soap, ether and alcohol.

The paraffin is drawn into the syringe till it is about $\frac{3}{4}$ full, the needle is attached and a few drops of hot sterile water are drawn up to fill the needle. This last maneuver prevents a mass of paraffin from plugging the needle by cooling there more quickly than in the loaded barrel. The syringe is then placed in sterile water which is kept at temperature of 120° F. till ready for use.

The assistant then places an index finger on either side of the depressed nostril and makes firm lateral pressure so as to prevent any malplacement of the paraffin.

The needle punctures the skin about $\frac{1}{2}$ of an inch below the lowest point of the depression and is carried upward subcutaneously to its upper limit. The operator then making firm pressure on the dorsum of the nose above and between the assistant's index fingers slowly empties the syringe. As the space fills the needle is gradually withdrawn leaving its deposit of paraffin as it recedes.

The paraffin sets quickly and any necessary moulding should be done at once.

When small quantities are injected there is very little reaction. I am in the habit of using not over 20 to 30 min. at one injection, even if the deformity is uncorrected because it can be repeated each week until the nasal outline is satisfactory.

Except in a small child no anesthetic is required.

Where cicatricial adhesions exist these must be subcutaneously divided and paraffin at once injected to separate the raw surfaces. The needle puncture is sealed with collodion and ice-cloths may be applied for a few hours, but when injecting the smaller quantities the reaction is so slight that it need not interfere with the patient's daily routine.

The two cases illustrated show clearly the possibilities of paraffin prosthesis, both were traumatic, in the one no adhesions existed, in the other much scar-tissue bound the integument to the underlying bone.

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NLVII.

A MODIFICATION OF THE KRIEG OPERATION FOR DEVIATED SEPTUM.

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The indication for operative interference of the septum narium in most cases is a lack of sufficient patulency of the nasal passages.

Posteriorly, where there is more room laterally, even a considerable deviation or spur will cause no marked obstruction, for on account of the increased room we also find there is a tendency for the turbinate to recede in a compensatory manner.

Anteriorly, the same degree of deviation or presence of a spur becomes of marked importance the nearer it lies to the anterior meatus. Here the nasal process of the superior maxilla presents an unyielding resistance to any compensatory shrinking, and consequently all manifestations of obstruction become accentuated.

Hence it is that most operations on the septum have to deal with the triangular cartilage and of these the major proportion are confined to the cartilage itself.

Consequently, it is always worth considering any procedure involving the operation on these parts, which is calculated to facilitate the ease of operating, hasten the period of repair, and leave fewer sequelae.

Perhaps the simplest method proposed is to make a permanent perforation, removing in part or in its entirety,

the deviation by either a scalpel or so-called "punch forceps."¹

Next comes the method of incising the septum in one or several directions and with force attempting to bend the offending part toward the wider naris and hold it there till healing takes place. For example, the Asch², Rethi³ and Gleason⁴ operations.

A more elaborate method includes those operations which propose to remove part or all of the cartilage and bone involved without incising both mucous walls of the septum. To this method belong the procedures of Ingals⁵, Petersen-Hartmann⁶ and Krieg-Boenninghaus.⁷

In the Ingals operation only a triangular section of the deviated cartilage is removed, thus making merely a small channel of permeability for the obstructed naris.

The Krieg-Boenninghaus operation removes not only all the cartilaginous, but also all bony parts entering into the deviation. An incision of muco-perichondrium is made perpendicularly and horizontally on the anterior and superior lines of deviation, the same is now separated on both sides by means of an elevator and removed by scissors and forceps, with no attempt made to save the muco-perichondrium on side of convexity.

The Petersen-Hartmann operation attempts to prevent this sacrifice of the muco-perichondrium of the one side, which leaves a large surface bare of normal mucous membrane to be healed over with changed epithelium. A flap of muco-perichondrium is made, dependent from above and corresponding to the size of cartilage to be removed. This is allowed to fall into place after removal of cartilage and does in a measure reduce the area of denuded surface, but on account of the difficulty in making incisions and the large area exposed by shrinkage of the flap it is not in much favor.

Freer⁸ has suggested some modification in the manner of saving the muco-perichondrium and has devised a number of special instruments to assist in carrying this out. A triangular flap is made, the perpendicular incision being on crest of deviation, the horizontal joining this anteriorly on its lower end, and drawn forward on its line of hypothe-

nuse. Then with special knives a triangular area of cartilage is removed and through this window the remaining cartilage. Instead of removing what bony parts enter into deviation as in the Krieg-Boenninghaus operation, fractures by means of a chisel are made and these parts brought into alignment with Roe's forceps.

While I do not offer a new operation, I propose a different *point of one seen* for the operation, and attempt to save all of the muco-perichondrium, removing cartilage and bone by the Krieg-Boenninghaus method.

After the usual preparation of field of operation, cocaine the mucous surface with either a ten or twenty per cent. solution, injecting either a five per cent. solution or a Schleich solution into muco-cutaneous junction of septum. Adrenalin solution assists to keep field comparatively free from blood.

With an ordinary scalpel an incision is made perpendicularly along the entire anterior edge of the triangular cartilage or side of convexity, this being facilitated by drawing the fleshy part of septum sharply to opposite side. With a small, flat, somewhat curved on the flat, perichondritome or elevator the muco-perichondrium is separated over the convexity. Then beginning at anterior edge of cartilage do the same on side of concavity. The field of vision is improved by having the assistant, who stands behind patient to steady head, use one or two blunt hooks or retractors to open naris in place of nose speculum. If desired a stitch can be taken in fleshy portion of septum, which will include a strip of gauze. This will help to retract anterior edge of septum to opposite side. When both sides of cartilage are stripped the mucous membranes generally balloon to opposite sides and expose the cartilage in its entirety.

The cartilage is now cut out preferably with a pair of Grünwald's alligator scissors. If more is desired to be removed superiorly or inferiorly, it can be trimmed down with a pair of Krause's fenestrated cutting forceps.

Should there be a bony involvement in the deviation, continue the separation backward of periosteum, and remove the bone with a pair of fenestrated cutting forceps, preferably those of Laurent.

If deviation involves only posterior half of cartilage, the in-

cision in same can easily be made in front of convexity and muco-perichondrium separated only over concavity of deviation.

With all deviation removed, the linear incision can be stitched or not as suits the operator, while moderate snug packing on both sides brings the muco-perichondrial walls firmly together and prevents an accumulation of blood between them.

In order to utilize this incision so far forward for those deviations situated farther back on septum it is necessary to strip a part of cartilage which is not removed. But there is no danger in this as it immediately adheres to mucous membrane on being again coapted. Thus the incision is maintained well forward where it can be preserved from injury during operation and completely united afterward. It is in a position through which it is easier to work and allows of better control of instruments when working far posteriorly and a good view of field of operation.

Nor is its utility limited to deviation. All spurs on cartilage or on cartilage and bone can be removed without interfering with the intactness of the mucous membrane. Through this incision first separate the muco-perichondrium and then by means of a chisel, preferably a Hajek spur chisel, the spur can be cut off and removed through this incision by forceps. The mucous membrane is then coapted to the straight and smooth septum by packing the naris involved. Thus no subsequent crusting and granulation tissue has to be dealt with; for the nearer the anterior meatus the more frequently this unpleasant sequela accompanies loss of mucous membrane.

It is no longer necessary to defend the procedure of removing cartilage and bone of the septum. This has been done well in the papers of the authors of the various operations and experience has proven the theory. I would say, though, that it is scarcely ever necessary to remove a strip of cartilage lying in apposition with the external bones and cartilages of the nose, and farther, in the greater proportion of cases there is reformation from the perichondrium.

The following cases are illustrative:

CASE I: Frank W., aged 33. Large hemispherical devia-

tion of septum toward right side involving most of the triangular cartilage and with an offshoot, running onto vomer. Incision at anterior edge of cartilage and removal of deviation. Two stiches taken. Time of operation, including preparation and cocainization, fifty-five minutes. Packing removed on third day, none being replaced. Stitches removed on fifth day, when septum was perpendicularly straight in median line and with healthy normal mucous membrane on both sides.

CASE II: Charles S., age 12. Left nostril completely occluded with a cartilaginous deviation, while the anterior edge of cartilage projected one-third of an inch beyond the median line to right, drawing extreme tip of nose with it. Under cocaine anesthesia anterior half of triangular cartilage was removed, including upper anterior angle, both straightening the tip of nose and removing deviation. Time required forty-five minutes. In spite of the patient's youth, he stood the operation with scarcely a complaint till almost through, when a reapplication of cocaine allowed completion.

CASE III: Henry E., aged 35. Large horizontal spur or ecchondrosis of left side of cartilaginous septum, appearing in external meatus and extending backward over an inch, projecting outward across naris. Usual incision and separation of muco-perichondrium, and then, with a Hajek spur chisel, spur was cut off flush with balance of septum and removed with rat-tooth forceps. One stitch was taken in incision and small gauze packing inserted to hold muco-perichondrium in apposition with cartilage. Gauze removed on third day, stitch on fifth day, with a perfectly normal unbroken mucous membrane to be seen on a straight septal wall.

CASE IV: Peter T., aged 29: Unreduced fracture of nasal bones from injury when child, with resulting "saddle-back" nose. Deviation of cartilaginous septum completely blocking left naris. On right side of septum a large horizontal spur, involving cartilage and bone, beginning anteriorly where deviation originates and so large as to half close right naris.

Through the usual incision cartilage removed so as to entirely and thoroughly restore left naris. Then through same incision the perichondrium and periosteum over spur on opposite side was elevated and spur cut off with chisel and re-

moved with forceps. Both sides packed with gauze and no stitches taken. Time of operation fifty minutes. Packing removed on third day and replaced by fresh, which remained two days longer. On tenth day corrected "saddle-back" depression with paraffin injection, when the septum was shown with intact normal membrane and all nasal obstruction completely removed.

I think these cases are sufficiently demonstrative of the utility of this line of procedure in such septal operations to claim for it:

- 1st. Shortening of time of operation.
- 2nd. Better command of field of operation.
- 3rd. Less hemorrhage, both at time of operation and secondary.
- 4th. No flap that can be injured during operation.
- 5th. Preservation of entire intact mucous membrane.
- 6th. A resulting straight and even septum.
- 7th. Need of but few instruments, and these not necessarily specially constructed for this operation.
- 8th. Should mucous membrane be punctured on side of concavity, a perforation does not follow.
- 9th. Shortening of time of repair.
- 10th. Obstruction of narium satisfactorily removed.

¹O. Bergmann: *Verletzungen, Fracturen, Dislocationen der Nase*, Handb. d. Lar. u. Rhin. III.

²M. J. Asch: *Trans. of 12th Annual Meeting of the Am. Laryngol. Ass'n.*—1890.

Emil Meyer: "Deviation of the Cartilaginous Septum, its Cure." *N. Y. Med. Jour.*, Dec. 1895.

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M. J. Asch: *Laryngoscope*, Vol. VI, 1899.

³Rethi: "Die Verbiegungen der Nasen-Schildewand." *Wiener Woch.* 1890.

⁴E. B. Gleason: "Treatment of Deflection of the Nasal Septum." *Jour. A. M. A.*, Vol. XXXVI, March, 1901.

⁵F. Ingals: "Deflection of the Septum Narium." Arch. of Laryngol., No. 4, 1882.

⁶Hartmann: Partielle Resection der Nasen-Schiedewand bei hochgradiger Verkrümmung. Der Med. Woch., No. 51, 1882.

Petersen: Ueber Sub-perichondriale Resection der Kuorpeligen, Naseschiedewand, No. 22, 1883.

⁷Krieg: Beiträge zur Resection der Cartil. Quadrang. Sept. Nar. zur Heilung der Scoliosis. Berl. Klin Woch. No. 31, 1889.

⁸Freer: "The Correction of the Nasal Septum with a Minimum of Traumatism." Jour. A. M. A., Vol. XXXVIII, March, 1902.

XLVIII.

PLATINUM RHINITIS.

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The etiology of the various forms of rhinitis has been so exhaustively treated that at first thought it seems superfluous to mention another factor, but in the cases to be reported this element, hitherto I believe, unrecorded is so plainly evident and of such importance as to merit special consideration.

Mr. A. G., age 36, photographer, was referred to me in October, 1902, by Dr. H. J. Wetherill. He had always enjoyed excellent health and until two years ago never had any trouble referable to the upper respiratory tract.

At that time he began to have frequent attacks of what was diagnosed "Hay-fever" and the picture presented was typical; nasal occlusion, hydropnea, sneezing and lachrymation. Various local and general treatments were given without avail and the symptoms have persisted, without interruption and with varying degrees of severity, until the present time.

He has been a photographer for twelve years of which the past four have been almost entirely devoted to work with the popular platinum prints. In 1901, two years after taking up this particular paper, the above mentioned symptoms developed.

In the beginning the symptoms never appeared until he had been at work in the dark room for from thirty to ninety minutes and rapidly subsided upon reaching the open air, but at present they originate within a few minutes and never completely subside.

When handling other prints the attacks do not occur.

As they are called forth by use of the dry paper, the oxalate of potash, muriatic acid and phosphoric acid with which the prints are treated need not be considered, for he never suffers when the previously cut paper is immersed in the bath.

This seemed like a clear case of rhinitis vasomotoria due to platinum chloride, but to exclude any other factor a careful general examination was given with a negative result.

The urine was normal and there was no evidence of a uric acid diathesis, or of a neurotic temperament.

The mucosa of both nostrils was highly inflamed, water-soaked and sensitive, and the inferior turbinal of either side was in tight contact with the septum. Under cocaine and adrenalin they retracted to normal and the only permanent pathological condition found was a small spur upon the anterior, inferior edge of the quadrangular cartilage, right. There was an accompanying acute congestion of the epiglottis and mesopharynx.

Cauterization of the hypersensitive areas with the subsequent use of adrenalin and oleaginous sprays caused the symptoms to completely disappear for one month after which they gradually returned.

Henceforth the nose remained patulous, but the hydrorrhea, sneezing and lachrymation were intense after each exposure. The spur was then removed, more tissue lightly cauterized and internal treatment instituted with nothing more than partial temporary relief.

Nasal tampons were unavailingly used and resulted one day in so completely blocking the nostrils that he resorted to mouth breathing, with the occurrence that night of a severe attack of laryngeal edema.

This completely disappeared after two days but thereafter the use of tampons was abandoned.

No relief from treatment having resulted I advised complete abandonment of this paper since when there has not been a recurrence.

Two similar cases with almost identical histories have been seen and one of these reports that his partner suffers in the same way to such an extent that he is about to retire from the business.

A fifth case has recently come under observation which presents features analogous to the others, but differs in one important particular. While paroxysms are precipitated by handling the dry paper, they are also produced by the use of the platinum toning solution—with which the American Aristo paper is treated. This solution is composed of phosphoric acid and platinum chloride, and here the symptoms can be definitely ascribed to the platinum for while phosphoric acid may produce rhinitis it is of a different type from the one here seen.

These cases can be classed under the head of "Occupation Coryzas," or "Coryza Professionalis," but in the long lists of atmospheric and chemical agents reported as causative factors, I can find no mention of platinum chloride or of any special predisposition on the part of photographers.

We find recorded the vapors and fumes of such substances as potassium bichromate, chlorin, mercury, ammonia, arsenious acid, iodine, bromin, osmic acid, benzoic acid, ipecac, muriatic and nitric acids, sulphur, fluorine, copper and zinc, and substances that act through their constitutional effects like phosphorus, chromic acid, arsenic, cement, lime, iodides, cinchona and digitaline.

Such occupations as engineering, bronze workers, thrashers, spice grinders, chemists, apothecaries, coal miners, millers, workers in wood, either carving or planing, weavers, metal grinders, stone workers, etc., have long been recognized as especially predisposing to rhinitis, either simple or ulcerative, some acting through purely mechanical means and others by their chemical effects.

In the five cases which I have seen the condition produced was analogous to hay-fever, and the absence of any ulceration or cartilage necrosis would indicate that the platinum acts as a pure mechanical irritant.

While these cases present nothing of special import from the stand point of pathology or symptomatology, not varying in any respect from the picture presented by vasomotor rhinitis due to pollen or allied irritants, they are of considerable interest and importance in their etiology.

It cannot be absolutely affirmed that the platinum is solely at fault, for it may be that some other irritant sub-

stance is combined with the platinum in this paper. As the process of manufacture is secret I was unable to determine this point.

Taking the two facts, the rhinitis due to the handling of the dry paper and that caused by the platinum chloride in solution with phosphoric acid, a clear case seems to have been made.

When we take into consideration the vast number who follow this profession and the present tendency toward platinum prints, it would seem that this condition must be fairly common and my experience, five cases within the past year, lends weight to this relief.

I know of no effective procedure aside from change of profession or the discontinuance of work with this particular substance.

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Fig. 11. The same ear. Section through the window. Luxation of the stapes and an apparently isolated focus in the bone. Magnification 7 times.



Fig. 12. The same ear. Section somewhat further posteriorly. Magnification 7 times.

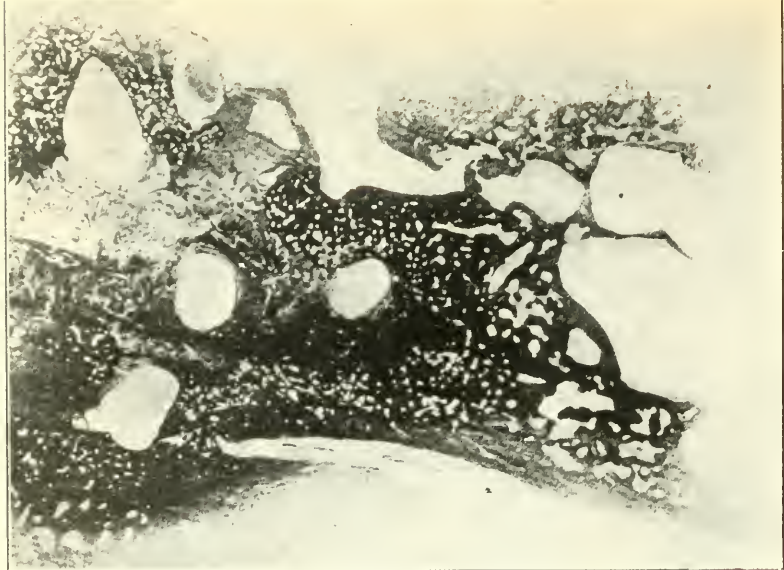


Fig. 9. Case VI, right ear. Section through the mastoid, the semicircular canals, the facial nerve, and the aqueductus vestibuli. Magnification 7 times.



Fig. 10. Case VI, left ear. Section through the cochlea and internal meatus. The facial nerve is wanting in the section and the ligament spirale was detached during the preparation from a part of the middle turn. Magnification 7 times.



Fig. 7. Case III, left ear. Section through the cochlea and internal meatus. Lesion in the internal meatus. Magnification 7 times.

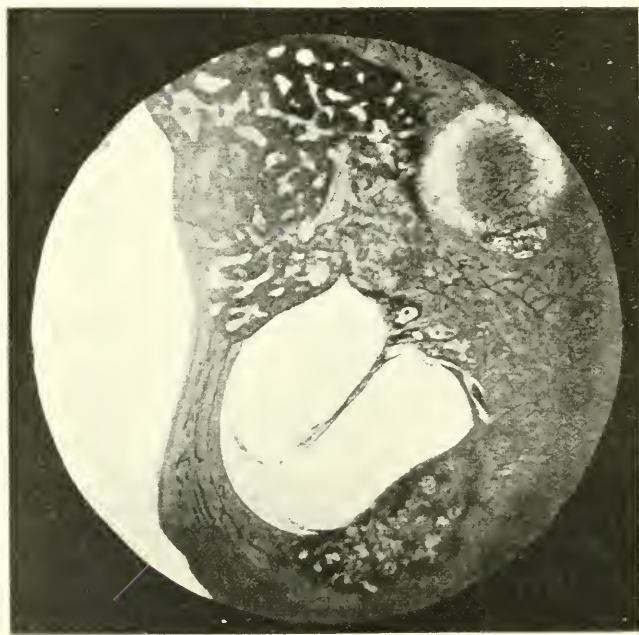


Fig. 8. Section through the promontory, the end of the basal turn and the macula acustica sacculi rotundi. Ostitic focus from the round and oval windows. Different stages of the ostitis near one another. Magnification 15 times.



Fig. 5. Section through the promontory, the facial nerve, the right vestibule and the end of the basal turn. The scala tympani partially filled out with bone. Magnification 9 times.



Fig. 6. Section through both windows and the macula acustica utriculi of the same ear. Case II, left ear. Ankylosis of the stapes. In both niches, considerable connective tissue. Magnification 15 times.

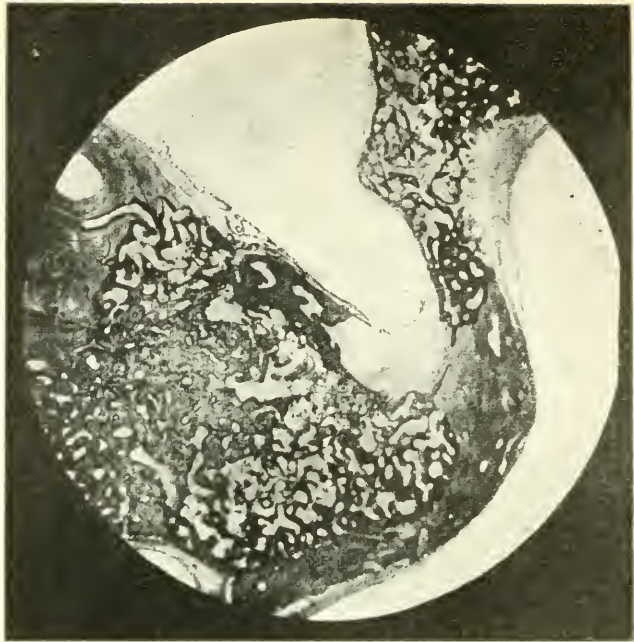


Fig. 3. Section through the promontory just before the niche of the window of case II, right ear. New formed bone in the scala tympani. Magnification 15 times.



Fig. 4. Section through the anterior part of the cochlea and the internal meatus, case II, left ear. Small fragments in the apical turns of the cochlea. Disease of the bone at the anterior periphery of the internal meatus and the internal wall of the middle ear. Endosteal new formed bone in the scala tympani of the basal turn. Magnification 6 times.



Fig. 1. Section through the anterior part of the oval window of the right ear of case I. The bone superiorly is sclerotic, and ulcerated both above and below, while the overlying periosteum is thickened. Magnification 25 times.



Fig. 2. Section through the same window further posteriorly, passing through the head, the posterior crus, the posterior part of the macula utricula, and the facial nerve. The bone above the niche of the window and the superior part of the base are diseased. Bony ankylosis. Magnification 15 times.

XLIX.

THE PATHOLOGY OF THE SO-CALLED OTOSCLE- ROSIS.*

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TRANSLATED BY

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The so-called otosclerosis has been the subject of otologic investigation for years, but it is yet so hazy and indistinct, that it is still necessary to investigate it. My own experiences with this subject, which reach back to the year 1891,† and which are scattered in my article on pathologic anatomy in Schwartz's Handbuch, and partially reported in different otologic meetings, are now presented in toto as a contribution to the knowledge of this disease. I have delayed till now to do so, by reason of the fact that I am continually looking for further light from new material.

CASE I.

The first case of this disease that I had an opportunity to examine is described in the second division of "nerve atrophy in the internal ear,"‡ as the last case, with the diagnosis, "a recovered inflammation of the middle ear, and a cured otitis in the neighborhood of the base of the stapes, ankylosis of

*Archiv. f. Ohrenheilkunde. Bd. 60. S. 37.

†Zeitschrift f. Heilkunde, 1891. Bd. XII. S. 351.

‡Ebenda. S. 357.

the stapes and atrophy of the nerve on both sides, in the cochlea." As this report is not well known, I recall briefly the most important features, with certain amplifications, which I have lately found on again looking over the specimens.

C. Adalbert, 63 year old day laborer from G., had had impaired hearing for 20 years, so that he could understand only the loudest voice near the ear. As to the cause of his ear trouble, unfortunately nothing was known. He laid for a short time sick with icterus and chronic nephritis in the clinic of Prof. v. Jaksch in Prag, and died there April 10, 1890.

The post-mortem, which I reported *in toto*, gave no explanation of the temporal bone affection.

On examination I found in the right drum a large cicatrix with a cone-like incorporation of the epidermis, the lining of the middle ear without any important change, and in the anterior surrounding wall of the oval window, as well as in the external wall of the niche of the round window, a focus of chronic otitis of the pars petrosa, which was described as follows: "In the vicinity of the base of the stapes, just below the facial canal, beginning at the oval window and reaching downward to the upper border of the ligamentum spirale of the end portion of the basal turn of the cochlea, and backward and upward to the external border of the macula acustica utriculi, the bone was pathologically changed. This part of the bone was clearly distinguishable from the normal, and the border between the two was usually sharply defined. The altered bone accepted the hematoxylin and carmine stains much stronger than the normal. In the diseased bone the Haversian canals were plainly increased in size, as were the bloodvessels passing through them. In many places there were also to be seen cells, similar to osteoblasts, in a row and lying next to the bone. The bone itself showed a very irregular structure, the bone corpuscles were often very irregularly scattered, in places seemingly increased in number and the bone in many places resembled, more, calcified cartilage. Just over the stapes was a large hole in the middle of the bone, which was filled out only with connective tissue. Similar holes were found immediately beneath the deeper layers of the mucous membrane in the niche of the oval win-

dow, both over the stapes, and also, more extensive, beneath this, and there the bone showed cavities filled with connective tissue as far as the periosteal layers of the labyrinth. The stapes itself showed no defect in its base; on the contrary, presented extensive calcareous deposits, which reached from the labyrinthal wall upon the stapes and so caused a partial ankylosis of its articulation. In addition to this circumscribed ankylosis by calcification, there were calcareous deposits in the cartilaginous portion of the articulation and of the connecting ligaments. The joint and adjoining bone were normal only on the posterior, inferior periphery of the stapes. That the tissue adjoining the pathologically changed bone had taken part in the disease, was proven on the one hand by an extensive thickening of the connective tissue in the neighboring periosteal layer of the mucous membrane lining the middle ear, and on the other hand, by a similar thickening of the vestibular endosteum, which bordered on the otitic focus, which showed numerous spindle cells, and also calcareous deposits in places.

The left drum was thin, atrophic and without a cicatrix. The lining of the middle ear and the changes in the bone resembled those of the right ear, with the difference that there was no disease in the external wall of the niche of the round window, and the process at the oval window extended from the latter's posterior circumference into the bone as far as the point of the nerve's passage through to the external ampulla. The process had also attacked the posterior portion of the base of the stapes, and had caused a bony ankylosis. In the anterior half of the niche of the stapes was a large mass of fibrous connective tissue, which surrounded the anterior bar.

To this description of the bony changes, I must add, after having studied over the old specimens, that the changes caused in the bone by the disease showed a varied character. There was found, on both sides, at the anterior periphery of the oval window, a plain sclerosis of the bone, which in places showed calcareous deposits; toward the middle ear, there were foci where the bone had a more porous character and was penetrated by wider vessels and medullary canals; while on the anterior and inner borders of the diseased focus, in the

bone as well as in the posterior periphery of the niche of the oval window, the disease showed a more acute character. The bone there was colored better by eosin, its cells were larger, and it was more of osteoid bone, traversed by numerous vessel spaces, which contained large vessels, numerous large cells, and isolated giant cells (osteoclasts). According to these findings, I must correct the title of cured otitis used at the time I reported the case, in so far that this is true for only a large part of the diseased portion, since the process in the periphery of the focus was caught in the stage of progression.

At that time I considered the purulent otitis media as the cause of symmetrical affection of the bone of both ears, for this disease had certainly been present in the right ear at least, and I assumed that both ears were affected by the same cause, perhaps as the result of another acute disease, or as the result of typhoid fever. The high degree of deafness had lasted at least 20 years before death, and it is possible that the changes at the window had lasted equally as long.

CASE II.

Magdalena N., 61 years old, servant, came on May 28, 1891, to the II medical division, in a moribund condition. According to the history obtained from her daughter, the patient for 15 years had suffered with severe and increasing deafness and severe subjective noises in the ears. Pain was present at times, in the beginning, as were dizziness and headache. A discharge from the ear was never observed. For about 10 years the patient was almost entirely deaf; she understood her daughter only when the latter shouted loudly into her right ear. In the left ear, which always had been worse than the right, she could no longer understand her daughter. The dizziness and pain ceased with the coming of complete deafness, while the ringing and crackling persisted, but with intermissions. Otherwise she was always healthy, suffering only from toothache and headache. The cause of the ear trouble was considered to be overexertion, from nursing her very sick parents 30 years before. At that

time she frequently complained of trouble in the head. An examination of the ears could not be made *intra vitam*, as the patient had a high fever and was delirious. The post-mortem of the patient, who died on May 28, 1891, showed:

Body medium sized, greatly emaciated, of strong bony frame. Cranium correspondingly large, longitudinally oval, symmetric, rather thick and compact. The vessel grooves on the inner surface were shallow. The dura was stretched, smooth, rich in blood. The sinus contained a little clotted blood. The pia was smooth in its convexity, slightly clouded over the vessels which were everywhere well filled with blood. The white matter of the brain was soft, moist, and sprinkled with numerous small and large bleeding points. In the ventricles, there was a large mass of serous fluid, by which they were distended. The plexus hard, containing little blood. The central ganglia of the cerebrum rich in blood. The cerebellum of similar appearance to the cerebrum, also rich in blood and moist in all parts. Pia of the base of usual character. The sinuses filled with fluid, dark clotted blood, subcutaneous tissue rich in fat, musculature thin, red brown. Fluid blood in the jugular.

The heart lay obliquely, correspondingly large, rich in fat, containing clot; the cavities of normal size; the walls of proper thickness, reddish brown. The valves were normal. Intima of the aorta in places showed calcareous deposits.

The apex of left lung adherent by connective tissue, the upper lobe contained air except where the apex showed a small cicatrical contraction, and there were scattered through it isolated hard fibrous, pigmented foci; otherwise it was edematous and rich in blood. The lower lobe everywhere contained air, was rich in blood and contained more fluid than the upper, everywhere in the bronchi there was tenacious mucous. The apex of the right lung was adherent by connective tissue, similar in appearance to the left. The upper lobe had a focus which was large, tough, pigmented and contained calcareous salts. Middle and inferior lobes similar to the left. The stomach was unusually dilated. The umbilical ring immensely dilated and through it the peritoneum was bulged out into a hernia in which was included the entire large omentum, up to its insertion, the

whole pars pylorica, and the beginning of the duodenum. The former was fixed in the hernia, the latter were free and enclosed at their free ends by the border of the umbilical ring. The spleen was very small, the capsule slightly thickened, the tissue soft and friable, the pulp scanty. The left kidney of medium size, the capsule delicate, easily detachable, the tissue firm and rich in blood. The right kidney somewhat richer in blood than the left. The serosa of the greater curvature of the stomach injected with blood, showed numerous ecchymoses; in it was a cloudy, bloody colored fluid. On the posterior stomach wall were two ulcers, one lying over the other, the upper of which was somewhat wedge-shaped, 1.5 cm. long, and the inferior was somewhat rounder and smaller. The borders were soft, and the floor was covered with a mass like coffee grounds. Otherwise the mucous membrane showed stasis, ecchymoses and swelling. The mucous membrane of large and small intestines was injected and contents slight. The sigmoid flexure and rectum filled with scybalae. The liver of medium size, its surface smooth, its peritoneal covering slightly thickened. On section the tissue was of soft doughy consistency, very bloody, dark red colored. The gall bladder medium in size and filled with thick, dark brown gall. The bladder wall thickened, contracted and containing almost no fluid. Genitalia normal.

The pathologic-anatomic diagnosis was hernia umbilicalis incarcerata. Tuberculosis obsoleta pulmonum.

The examination of the auditory apparatus, which was given over to me, revealed nothing special on the drum or in the nerve in the internal meatus. The bone was not sclerotic and was comparatively easy to saw through. When the air in the internal meatus was compressed, a manometer attached to the superior semicircular canal showed no movement of the fluid. The mucous membrane of the middle ear and antrum was apparently unchanged, the stapes immovable in the oval window. The larger vessels on the promontory were filled with a large quantity of blood. The external part of the temporal bone was hardened in sublimate, the internal in Müller's fluid, decalcified and examined histologically.

MICROSCOPICAL FINDINGS.

RIGHT EAR—INTERNAL EAR.—A large amount of pigment between the nerve and the ganglion cells in the cochlea, along the lamina spiralis, in the stria vascularis, and a large quantity of free pigment also lay on the stria vascularis. At the end of the basal turn was found an extensive hemorrhage in the ligamentum spirale. The ganglion cells in the reverse portion of the basal turn were lessened in number, a large part of the scala tympani, the lowest turn, was filled out with new-formed endosteal connective tissue. A large part of the new-formed bone bordered on a chronically inflamed focus in the posterior portion, and like this was pathologically changed. The periosteal covering of the vestibule was for the most part calcified, large quantities of pigment being deposited in and upon this, and, likewise, considerable pigment in the cristae and the neighboring portions of the superior and external semicircular canals, below the epithelium and between the nerves. The disease of the bone reached to the point of passage of the ramus vestibularis to the macula utriculi, but did not affect this. The internal wall of the membranous semicircular canals was mostly smooth. Only on the external portion of the external canals were found small prominences (papillae). The aqueductus vestibuli was free, the neighboring vein considerably dilated and full of blood; the aqueductus cochlearis was open where it empties into the cochlea, but could not be found further on in the desired bone, but its internal portion could plainly be seen. I was unable to find the vein of the ductus venosus.

MIDDLE EAR.—Only a portion of the bony Eustachian tube was in the specimen. The lining of the inferior wall was enormously thickened by increase of the submucous and periosteal connective tissue, and numerous villous projections were to be found on the superficial surface. The surface of the bone was often uneven, as though corroded, large vessel passages led to large cavities in the bone with similar surfaces, which were filled out by fibrous connective tissue. At many places, the walls of these cavities in the bone showed considerable calcareous deposits, as was to be seen by the more pronounced staining with hematoxylin.

THE DRUM, as a whole, was thin and only the mucous membrane layer, which consisted of fibrous connective tissue without distinct nuclei, was in places thickened. In the tympanic cavity the mucous membrane of the promontorium was somewhat thicker, and contained a rather large number of spindle cells and, in places, developmental cells, which could be followed, by means of the dilated vessel channels, into the bone. The mucous membrane of the inferior half of the promontory was especially thickened. Here was found a thick periosteal layer of sclerotic connective tissue, which contained only a few long spindle elements, and the thickened mucous membrane lay on this layer with evident signs of a chronic inflammation. The anterior portion of the niche of the round window was closed, partly by exostoses of the diseased bone, partly by fibrous connective tissue, but the posterior part was free. Yet, even here, on the inner side of the membrane of the window, was found the new formed bone mentioned above, which filled out the greatest part of the scala tympani. A plate of bone was formed which continually grew thinner, and which was found only in the center of the membrane in the sections through the posterior portion of the window. This bone was in direct communication with the diseased bone of the promontory. The membrane of the round window itself, was not thickened and was otherwise normal.

The anterior portion of the oval window was likewise narrowed by hyperostoses of diseased bone, and the base was entirely enclosed by it, which here extended into the vestibule in the form of a flat exostosis. An irregular calcareous mass, without evident bone cells, surrounded by thickened connective tissue, lay here in the diseased bone. Further posteriorly, the base was plainly seen, but, especially on the inferior side, to far posteriorly, was in bony union with the diseased bone, and the inflammation reached into the anterior part of the base of the stapes. Only the posterior part of the base of the stapes and its vicinity was free from disease. The crura of the stapes were thin, as was the base, the bone alternated and the articular facets were not present. The cartilaginous surfaces of the hammer-anvil articulation were for the most part calcified.

The mucous membrane of the ANTRUM and MASTOID as well as that of the posterior part of the tympanic cavity and aditus were similarly thickened and altered. In places, signs of chronic inflammation and thickening with spindle and developmental cells, especially in the dilated vessel channels of the neighboring bone, and often in the latter were cavities filled with connective tissue.

BONE.—In the anterior inferior portion of the temporal bone were enormously dilated medullary spaces filled with medullary substance, and between them pneumatic cells lined with thickened mucous membrane, and some cellular spaces entirely filled with connective tissue. Above these and in connection with them, the bone was pathologically changed as far as the anterior inferior periphery of the cochlea and the anterior inferior wall of the internal meatus. It was traversed by large vessel spaces, in places, near the border, sclerotic, and showed in the wall of the internal meatus several large cavities, which were partially filled with connective tissue rich in cells which was in direct communication at this place with the periosteum, similarly diseased, thickened and rich in cells. The bone in these spaces, as well as elsewhere in the internal meatus, was uneven on the surface as though eroded (Howship's lacunae). They are also, in connection with the vicinity of the canalis ganglionaris and the bone of the lamina spiralis of the basal winding, calcified, as is seen by the intense coloring with hematoxylin. The inflammatory focus in the bone reaches as far as the periosteum of the basal cochlear turn. It attacks the portion that lies below and extends forward, in its inferior, internal and partially external part, and reaches here nearly directly the periosteal coat of the ligamentum spirale. A large part of the basal turn, as a result of the inflammation in the bone, is affected with new-formation of connective tissue and bone which fills out most of the end of the scala tympani as far as the membrane of the round window. This new-formed periosteal bone is later attenuated by the chronic inflammation of the bone in the petrous portion and fresh inflammatory changes are found, as in the surrounding bone. Posteriorly, the focus reaches to the round window in whose anterior portion the diseased bone forms exostoses both on the promontory and

the inner wall, while in the posterior part of the round window, the bone is nearly normal. Only the vessel channels of the bone contain richly proliferated connective tissue, and are surrounded by bare spaces of late growth.

A second focus of altered bone is found above the first on the inner wall of the middle ear. It reaches forward to the region of the apical turn of the cochlea, and here lies between mucous membrane and cochlear periosteum. From above downward it is from 4 to 5 mm. in height, and reaches upward to the facial canal and downward to the middle of the promontory. Internally, it borders on the apex, then on the middle turn, and further back on the vestibule, then surrounds the greater part of the stapes and reaches to the point of passage of the nerve from the utriculus through the bone, which is surrounded at its anterior external portion, and then ends at the posterior portion of the oval window, without reaching the latter's posterior border. Both of these diseased foci in the promontorial bone are joined only by a dilated vessel space, whose wall appears greatly calcified, and are otherwise separated, in the middle of the promontory by a layer of healthy bone.

Finally, a third focus of greatly altered bone is found between the facial and the external semicircular canal. It is sclerotic, traversed by medium dilated channels, in whose neighborhood, the bone is deeply stained by carmine and eosin. In addition, the other parts of the pars petrosa and mastoid show distinct changes. In many places the channels are obliterated, and even in the bone are found new-formed younger layers surrounding large remnants that stain deeply with hematoxylin. The former are sharply differentiated, by their peculiar lammellating layers, and clear red color, from the parts previously described. Large bone corpuscles with few projections and distinct cells distinguish this bone from the old.

The histologic character of the pathologically altered bone is different at different places. Ordinarily, the border portions of the diseased bone show the plain picture of sclerosis of the bone. The bone stains darker with hematoxylin, its vessels spaces, with the exception of isolated smaller ones, are obliterated by layers of new-formed bone along their

walls and often by deposits of calcium salts in the remains of the former lumen.

This part of the bone contains no medullary spaces, the bone cells are pressed close together, show numerous irregular projections and often on their inner wall are stained deep blue or black with hematoxylin as a sign of a more pronounced calcareous deposit. In places, a similarly affected bone lies next to this sclerotic bone, which however has less calcareous deposits, and contains numerous widened vessel spaces at other places in the diseased portion, and in the outer boundaries of the foci, especially at the inner wall of the promontory, the bone is altered in another manner. The bone shows lamellar structure, absence of the nests of cartilaginous cells otherwise present, stains light blue with hematoxylin, although not exactly like normal bone. Its bone corpuscles are in places larger, show fewer projections and plainly staining bone cells. This bone is traversed by large spaces. That contain scant connective tissue and isolated fat cells. In places in this bone, are parts that show a redder color, internally passing over into parts that stain deep red with eosin, in which the inflammation still persists. Here the bone is extremely porous, is traversed in all directions by extremely dilated channels, between which are small bridges of osteoid tissue. This never shows a lamellated structure, its cells are clearly larger and have fewer projections. Along the dilated channels lie long spindle cells, and large round cells with large nuclei. The latter are often found in the smallest lymph spaces of the bone which lead from the diseased into the neighboring healthy bone. They resemble osteoclasts which usually lie alone on the walls of the spaces leading into the larger vessels. Where they lie against the bone is usually a rounded space surrounding it like a semicircle. What role is played by the cells lying next to the healthy bone cannot be determined, since the healthy bone shows no changes up to its very border. As to the relation of these freshly diseased portions to the other bone, it can in general be said only that they lie further inward, further from the middle ear. Thus, fresh bone disease is found at the anterior inferior border of the cochlea, likewise corresponding to the apex of the cochlea, and at the posterior and

internal border of the focus at the oval window. The disease in the niche of the oval, and the anterior part of the round window shows occasionally a comparatively fresh character and here the small osteoid bands of bone which stain faintly with eosin reach to the periosteum of the middle ear which is greatly thickened, poor in nuclei and of a fibrous character.

LEFT EAR.—INTERNAL EAR.—The nerve cells in the cochlea, especially in the upper windings are not as numerous as under normal circumstances. The richness in pigment is somewhat less than the right. In the basal turns, a vessel in the *prominentia spiralis* is unusually wide. The *lamina spiralis* is unusually wide. The *lamina spiralis* and the surrounding of the ganglion canal of the basal turn are greatly calcified. In the *scala tympani* of this turn was newly-formed bone and connective tissue in large amount are found. The *ductus venosus* of the cochlea is free, the *acqueductus* in its inner portion likewise, but in the outer part is not demonstrable in the diseased bone. The vestibule and semicircular canals show the same condition as the right.

TUBA EUSTACHII.—The epithelium of the cartilaginous portion is well retained, and below this, in places, long portions of the mucous membrane are infiltrated and inflamed, epithelioid and spindle cells being especially prominent. Most of the lining of the bony portion was thickened, in places thinner, and contained cells in only a few places. The neighboring bone showed irregular jagged cavities filled with a dense fibrous connective tissue. The periphery of the bone in these cavities is usually very calcareous, and stains a dark blue with hematoxylin. Near the middle ear, in the medullary spaces of the vicinity of the tube, are profuse hemorrhages; in certain parts of the bone, filled with connective tissue, are large masses of calcium salts, and furthermore, certain jagged protuberances of the bone into the tube, resembling osteophytes.

The DRUM is unusually thin, and stains badly, so that formed elements are hard to distinguish. Irregular spaces, corresponding to the inferior border of the drum are found in the mucous membrane, whose submucosa is formed of fibrous connective tissue. Large numbers of similar spaces

are found in the mucous membrane covering of the hammer and anvil, representing the ligaments. No epithelium is demonstrable on their inner surfaces, the connective tissue of the submucosa is to a large extent calcified. On the hammer, internal to the short process, is a large space filled out with fibrous connective tissue. The bodies of the hammer and anvil contain numerous medullary spaces filled with medullary substance and dilated vessels. The articular cartilage is almost entirely calcified. Irregular masses of lime salts are found in places in the vessel channels and bone of the anvil.

MIDDLE EAR AND WINDOWS.—The mucous membrane of the tympanic cavity is almost everywhere changed. This is especially visible in its deepest layers, especially thickened over the diseased bone, even being callous, and it contains over the foci of acute bone disease numerous cellular elements, rows of spindle cells, while the well developed epithelium often follows immediately over this layer. At other places is a submucosa with wide vessels, spindle and developmental cells. Especially thickened is the mucous membrane in the anterior part of the niche of the round window, whose inner half is entirely closed by connective tissue. The oval window has somewhat less. In the latter are comparatively fresh inflammatory changes.

The articulation of the stapes with the oval window is ankylosed, partially by a more or less broad new formed spur of bone, which jutted forward from the surrounding diseased bone into the base, and partially by a calcification of the annular ligament. The ring itself is greatly attenuated by the disease of the bone and is actually defective at one place in the posterior part, so that the thin mucous membrane lies directly upon the periosteum of the inner wall of the vestibule. The latter as well as the subjoining cartilage, from which it cannot be separated, is calcified. In the anterior part of the oval window the diseased bone projects into the vestibule in the form of an exostosis.

The round window is free in the anterior portion, in the direction of the middle ear, but here the membrane lies on new-formed bone which fills out the greater part of the scala tympani. Further back this bone gradually lessens, and the

disease of the bone passes over upon the stapes, whose base is similarly diseased, thence to the neighboring bone of the promontory as far as the round window, which it posteriorly attacks and narrows by small exostoses from the side. Here fibrous connective tissue lies on the membrane of the round window, externally, and fills out the posterior portion of the niche of the window. In the anterior, internal part of the niche considerable pigment is imbedded in a looser connective tissue.

ANTRUM AND MASTOID CELLS.—The mucous membrane has the same appearance as in the middle ear, except that it is somewhat thinner, and thickened only in isolated pneumatic cells. The subjoining bone often shows lacunar formation, in other places large spaces filled with connective tissue, and often there are evidences of new formation of bone, beautiful areas of new-formed bone in vessel channels of the bone bordering on the antrum.

BONE.—The bone tissue of the temporal shows several foci of disease, which, with slight exceptions, have a similar distribution to that of the right side. In the anterior part of the pars petrosa are very dilated medullary spaces, and isolated, large pneumatic cells, and the latter are almost entirely filled out with connective tissue. The latter, which are connected with the middle ear, lie directly under the diseased bone, which surrounds the internal meatus on its anterior periphery, and forms a large exostosis in it, which rests on the nerve, and large spaces, partially filled with connective tissue, which are joined to the internal meatus. This focus borders for quite a distance on the lowest portion of the scala tympani and is in communication with the bone and connective tissue which fills this out. Posteriorly it reaches only to somewhat in front of the external mouth of the aqueductus cochlearis, in vicinity of which the bone is still healthy. The bone that partially fills out the scala tympani reaches somewhat further posteriorly than the otitis focus does. The second focus, in the vicinity of the stapes, reaches further forward on the left side, to the bony tube, and borders internally on the upper and middle turns of the cochlea, and externally directly on the periosteal layer of the lining of the middle ear. Further posteriorly, it

stretches, both above and below, the facial canal, which runs from the internal meatus to the middle ear, far inward, below nearly to the internal meatus, making a small exostosis in the canal itself. Posteriorly this focus stretches unusually far, to behind the region of the ampulla of the external semicircular, where it affects the entire bone between the facial canal and the external wall of the ampulla and the semicircular canal. This focus possesses a width of 5 mm. from above downward in the bone of the internal superior wall of the middle ear, between periosteum and cochlea, vestibule and external ampulla. It surrounds the base of the stapes, and the external portions of the branches of the nerve to the utriculus and the external semicircular canal at their passage through the bone. Its posterior part affects the entire promontory, to its lowest part, and here reaches to where the bone fills out the scala tympani, and also affects the posterior border of the round window's niche, while the bone of the anterior is still healthy. The base of the stapes is likewise totally diseased and in places forms a mass, which is connected with the labyrinthal bone. Only on the superior and inferior border are remnants of the annular ligament visible. These two foci have no direct connection with each other, yet there is found in the otherwise healthy bone in the inferior half of the anterior portion of the promontory dilated vessel spaces, with areas of new formed bone. Wide channels, with dilated vessels, run from the periosteum and above mentioned cells in the anterior inferior part of the pars petrosa into the diseased bone.

In addition to these two large foci the bone shows in other places, especially in the superficial subperiosteal layers, thin sheathes of osteoid or new bony tissue, especially in the region of the often dilated channels. The surface of the bone is corroded in places and contains irregular excavations.

The histologic character of the left diseased bone corresponds entirely to that of the right temporal. Likewise, the division of the bone by the past and the still present otitis, is entirely as on the right side, so I can omit any further description here.

If, in conclusion, we glance over the changes found in both temporal bones, as well as those in the lining of the middle

ear as in the bone, we must come only to the conclusion that we are dealing with the sequelae of an inflammation, which has passed away in the lining of the middle ear and partially also in the bone, but which still persists in places in the bone, or has recently become worse. We must believe, according to the history, that it began about 30 years before the death of the patient with severe ringing, and occasional sticking pains and deafness. This inflammatory process, then, in various places, passed over to the bone, doubtless anteriorly from the lower pneumatic cells upon the anterior border of the cochlea and the internal meatus, and then from the niche of the windows to the neighboring bone in which it caused a chronic otitis and osteomyelitis. It is plain that thus a large part of the end of the scala tympani was filled out with new-formed bone and connective tissue, and it is no longer possible to determine from the specimens whether this took place by a continuance of the process from the first described foci, or at the beginning of the disease, a severe otitis media passed over through the membrane of the round window to the end of the scala tympani and there caused an endosteal new-formation of bone and connective tissue. The latter is contradicted by the fact that this bone in the scala tympani borders only slightly on the membrane of the round window, and reaches its greater width further on. The extensive changes in the lining of the middle ear as well as the bony portions of the temporal bone bordering on the middle ear indicates an extensive inflammation of the lining of the middle ear at least originally present.

CASE III.

Alois St. 58 years; deaf since middle age. The hearing has been growing worse year by year. He has never had pain in the ear or dizziness. Often had dumb feeling in ear, and on the right side ringing and sounds like the striking of the clock. Often suffered from severe colds.

Examination of ear revealed the drum somewhat retracted and slightly milky and discolored; the light reflex clear. Left, drum greatly retracted, milky, discolored, the light reflex

dull. The examination of the nose and throat of the patient who lay in the I. medical division, was not made.

The tests for hearing gave:*

$$\begin{array}{c}
 W \\
 R \nearrow L \\
 O \left\{ \begin{array}{c} U \\ U_s \\ W_w \end{array} \right\} O \\
 1.0 \text{ St. } 0.50 \\
 0.02 \text{ Fl. } O \\
 7'' \text{ Cw } 6'' \\
 \text{--- R ---} \\
 4'' \text{ c } O \\
 \text{--- } 20'' \text{ c}^\dagger \text{ --- } 25'' \\
 \text{--- C}^\dagger \text{ H}^\dagger \text{ C}^\dagger
 \end{array}$$

The patient died August 7, 1891, and the postmortem held Sept. 8, in the pathologico-anatomic institute gave: Well nourished, strong individual, edema of lower extremities. Severe edema of pia, much fluid in ventricles, whose ependyma is delicate. The vessels at the base of the brain rigid, the brain substance atrophic, very moist, medium rich in blood, narrow cortex. Free fluid in pericardium and pleura. Heart very large, muscle fragile, pale and yellowish spotted. Left cavity likewise wide, walls thick. The aortic valves, as well as those of the right heart delicate, the free border of tricuspid thickened, the chordae tendinae retracted and thickened. The lungs everywhere contain air, are rich in blood and very edematous, pressed together at bases. Bronchial mucous membrane dark red. The spleen large and indurated. Left kidney enlarged, capsule adherent, surface delicate, granulated. Pyramidal markings distinct, tissue hard, brownish yellow. Right kidney very small, deep infarcts, cysts and granular surface.

*W = Weber, U = Watch, U_s = watch on the Temple, W_w = watch on mastoid. St. = voice, Fl. = whisper. Cw = small Lucæ fork on mastoid (normal 16 seconds). R = Rinne (normal = + 36'') c = the same directly after being struck, normally heard 56'', c[†] = normally 42''. H = Range of hearing for all forks by air conduction.

†The lower border not determined. C^s not heard.

Gastric mucous membrane swollen and folded, very red and ecchymotic over the folds. Same symptoms of stagnation in intestines. Liver changed into form of stagnation, nutmeg liver. Mucous membrane of bladder delicate and pale, genitals normal, aorta atheromatous.

Diagnosis—*Hypertrophia et dilatatio cordis totius praecipue cordis dextri cum degeneratione adiposa. Insufficiencia valvularium tricuspidalium. Venostasis et hydrops universalis. Atrophia renis p. infarctus. Atheromatosis aortae. Induratio.*

At the post mortem, both middle ears and semicircular canals were opened, the temporal bones removed and hardened in Müller's fluid. Previously cultures were made from the profuse mucous contents of the middle ear. Those from the left middle ear were sterile; those from the right showed four colonies of *aspergillus glaucus* to the tube. During further section of the temporal bone, I found the bone around the antrum and in the mastoid very pneumatic, the stapes immovable, and the round window closed by connective tissue. The specimens were then decalcified, embedded in celloidin, and the histologic examination undertaken.

MICROSCOPIC FINDINGS.—RIGHT EAR.—The fundus of the bone of the internal meatus showed thin layers of new bone containing a large amount of calcium salts, as it stained very deeply with hematoxylin. Large hemorrhages in the fundus of the internal meatus.

The ganglion cells of the cochlea, especially the basal turns, greatly decreased, as are the nerve bundles in the lamina spiralis ossea. Nothing of importance in the vestibule and semicircular canals.

MIDDLE EAR.—The submucosa of the cartilaginous tube fibrous with few cells. At the isthmus is an anomaly, where there is a saccular bulging of the bony tube external and superior to the end of the cartilaginous, so that the superior wall of the cartilaginous does not pass directly over into the superior wall of the bony tube, but the latter lies several millimeters higher than the former. The wall of the bony tube shows projecting pieces of bone, between which deep excavations are seen. Several neighboring cells are filled with connective tissue containing spindle cells.

The lining of the tympanic cavity is in general somewhat thicker and of a more fibrous structure, with few cellular elements, the epithelium is well retained. In places, masses of calcium salts are imbedded in the mucous membrane. The lining is thickened especially where it borders on the diseased bone, and in both of the window niches.

The oval window is somewhat narrowed through increase in the surrounding diseased bone, and the diseased bone has entirely grown around the anterior part of the base of the stapes. A very thick fibrous connective tissue lies on this bone in which is enclosed the middle part of the anterior bar of the stapes. There is no stenosis of the middle and posterior part of the niche, since here both above and below, the superficial bony layers of the wall of the niche, with the exception of a few small remnants imbedded in connective tissue, have entirely disappeared on account of the disease, and are replaced by connective tissue. At the inferior posterior border of the niche, a large portion of the bone, up to nearly the vestibule, has been ulcerated away and replaced by connective tissue. The base is fixed in its anterior part, and somewhat outward, and cartilage and annular ligament form a calcified mass, which is connected with the diseased bone. Further posteriorly is a simple calcification of the cartilaginous layer, and only postero-superiorly is the calcified cartilage of the base firmly united with the diseased bone of the wall of the niche. The base itself consists in its anterior part of sclerotic bone, and in its posterior part shows no change other than a calcification of the cartilage continually increasing in amount. An exostosis narrows the anterior portion of the niche of the round window, and this, the further posteriorly it goes, gets even closer to the diseased medial wall of the promontory whence it springs, and reaches inward so that more and more of the *membrana tympani secundaria* are visible. The posterior part of the niche is completely free.

Only the mucous membrane of the drum is thickened, and considerable pigment grains are deposited in this as also in the layer of circular fibres. The chain of ossicles show calcareous deposits in the articular cartilage between the hammer and anvil, as well as between the latter and the stirrup.

The mastoid is very pneumatic, and the mucous membrane in aditus and antrum considerably thickened, but is not much altered in the cells.

The small arteries in the facial canal, the promontory and internal meatus show circumscribed thickenings of the intima due to endarteritis, and the latter also thickening of the adventitia, consisting of sclerotic connective tissue, poor in cells.

BONE. In the pars petrosa are three circumscribed disease foci. The first and smallest lay in the internal meatus on its inferior periphery, some millimeters from the bottom of the meatus, inward immediately below the thickened dural covering, beneath which the superficial bone is somewhat defective, connective tissue taking the place of the bone. It extends like a tongue downward consisting throughout of sclerotic bone with irregularly lying bone corpuscles and scant, somewhat dilated vessel channels which contain a fibrous connective tissue poor in cells, and into which emptied the channels of the surrounding and likewise sclerotic bone, for the most part obliterated and calcified. Otherwise, the bone showed sclerosis for a considerable space around this focus, as well in the periphery of the internal meatus, as further downward. Its canals everywhere stain deeply with hematoxylin and show neither lumen nor vessel. Forward and inferiorly, this bone borders on a large wide pneumatic space, which extends from the tympanum deep into the bone.

A second focus, which surrounds the oval window reaches with its apex forward to the middle turn of the cochlea, at whose periphery just at the ligamentum spirale, it ends. Posteriorly it becomes broader and surrounds the space between the facial above, the round sacculus inward, and the tympanic cavity, outward, and reaches posteriorly to the oval window whose periphery it surrounds, but the inferior border ends in front of the posterior border of the niche of the window, while the superior border extends in the bone as far as the ampulla of the external semicircular canal. This focus also shows, with few exceptions, throughout, old changes that have already ceased. It is traversed by wide channels in which a small amount of connective tissue with fat cells lie. In the periphery of this focus, are many scleroses of the bone, and the diseased bone everywhere is

distinguished by its structure and deep reddish blue color (hematoxylin-eosin) from the old, as new formed bone. Fresh inflammatory changes are found only at the anterior and posterior pole of this focus, and at the latter place, both above and below the niche of the oval window. Here the new-formed bone consists of osteoid tissue with osteoblasts, traversed by large channels with dilated vessels and large developmental cells. Giant cells, and osteoclasts demonstrable at the border of the healthy bone.

A third focus is found in the vicinity of the round window. It extends forward to the region of the external mouth of the aqueductus cochlearis, without reaching to the endosteum of the cochlea, then becoming wider surrounds the anterior border of the niche of the round window, and then especially on the inner side of the promontory, extends inward and upward into the scala tympani as an exostosis. This focus reaches only the external periphery of the round window, i. e., in the promontory, and in the posterior part of the niche is connected with the above described second focus at the oval window, as both hang together by a dilated channel with pathologically altered bone in its walls. This third focus is distinguished from the former by the fact that it shows almost throughout its entire extent fresh ostitic changes and only at places on the periphery sclerosis of the bone. The cellular infiltrated channels of this bone often border directly on the healthy bone.

The bone of the temporal bone shows almost everywhere pathologic changes. The cells which are ordinarily found in the bone of the pars petrosa above and below the labyrinth capsule, are very much reduced in size from within by deposits of new bone, and this is to be distinguished from the old only by its deeper staining with eosin and its different arrangement in layers. The channels in the bone of the pars petrosa have their inner walls more or less calcified and often entirely eroded. Likewise radical changes are found in the external portion of the temporal bone, in the vicinity of the tube, and the Glaserian space. The latter shows very large deposits of chalk on its bony borders, and the cells in the neighborhood of the bony tube are entirely filled out with fibrous connective tissue, and the surrounding bone is sclerotic.

The bone of the mastoid is comparatively unaltered. Only around the semicircular canals are sclerotic parts to be found in the bone, while the posterior parts of the mastoid are entirely pneumatic, without special changes.

LEFT EAR.—THE INTERNAL EAR shows similar changes to the right.

MIDDLE EAR.—In the Eustachian tube, otherwise similar to the right is the same anomaly, only more pronounced. The end of the bony tube, in its superior portion extends somewhat further forward over the isthmus.

The lining of the middle ear is in general somewhat thickened and lumps of chalk are deposited in it in places. The inner layer of the drum shows considerable pigment. The anterior portion of the niche of the oval window is filled out by a rather thick exostosis of bone and further down and behind by fibrous connective tissue. Posteriorly, the lining is very thick, and is partially connected with fibrous connective tissue at the spots of ulcerated bone, and this encloses several remains of bone in which considerable chalk, but no plain bone structure, is demonstrable. The connective tissue mass shows itself on the inferior border to a large extent greatly calcified. The bars of the stapes are fixed to the wall of the niche by connective tissue adhesions, especially the posterior bar, while the anterior is partially enclosed in the exostosis. The base of the stapes in its anterior superior part, is largely dislocated out of its articulation with the labyrinth wall, and is joined to the neighboring wall of the niche anteriorly by new formed bone that has affected half of the base of the stapes, and further posteriorly and superiorly by strong connective tissue. The cartilaginous sheath of the articular facets and the annular ligament are greatly calcified and the chalk in the ligament can be followed into the upper border of the window as far posteriorly as the middle, where the articulation again shows a normal condition. In the most superior posterior part of the niche, the disease of the neighboring bone again passes over to the base of the stirrup, which here is again bound by bony union to the neighboring parts. The anterior portion of the niche of the round window is considerably stenosed by a large exostosis from the promontory and a smaller one from the medial wall, and the remaining portion

of the border of the niche is filled out by loose connective tissue. Posteriorly the niche is free, only somewhat narrower, because of the exostosis of the promontory, which becomes smaller the more posteriorly it goes, and the membrane of the round window is made appreciably smaller by this exostosis. The bone of the large ossicles is sclerotic, and shows abundant chalk deposits as do the cartilage of the short process and the articular cartilages of the hammer and anvil that touch the bone.

The mastoid is extremely pneumatic, like the right, and in it are also found large pneumatic cells at the posterior region of the aqueductus vestibuli. The mucous membrane in the cells is somewhat thickened, individual small cells in the anterior portion entirely filled out with connective tissue.

The arterial vessels of similar appearance to right. The bone of the pars petrosa shows 3 foci of disease similar to the right. The first, in the internal meatus, lies somewhat nearer to the cochlea and reaches into the bone of the labyrinth capsule itself. It consists of greatly calcified bone with dilated channels without acute inflammatory changes and is joined below by a piece of sclerotic bone with the cells beneath the cochlea, which here reach far inward and upward. The extent of the second focus corresponds almost exactly to that of the right side. It extends forward to the posterior superior border of the middle turn of the cochlea, but anteriorly is considerably smaller than the right, and the fresh ostitic changes, in comparison with the old, reach a greater extent, since on the left side not only the anterior and posterior poles of the focus, but also the entire inner zone, as well as the anterior and posterior periphery of the niche of the oval window are freshly diseased, and at these places the disease is everywhere advancing toward the healthy bone.

The third focus, at the round window, is at its anterior periphery somewhat broader than the right, extends into the scala tympani in the form of a spongy exostosis, and is then confined to the medial side of the promontory, to end here at the posterior wall of the niche. Anteriorly it shows fresh ostitis at the external and internal periphery, sclerosis of the bone, and posteriorly only more sclerotic bone with slightly dilated vessel channels. On the left side the vessel connection

in the promontory between the second and third foci is absent. What was said of the right side applies to the rest of the bone.

If, in summing up, we review the changes in both temporal bones, which for the most part are very similar, we must draw the conclusions from the diffuse changes of the lining of the middle ear, from the chalk deposits therein, from the filling with connective tissue of certain cells bordering on the middle ear, tube, and aditus, as well as from the diffuse changes in the bone, that we are dealing with the sequelae of a preceding otitis media, which extended from the tube to the mastoid and affected only the most posterior portion of the mastoid to a medium degree. The circumscribed foci in the bone of the pars petrosa can be considered only as the result of an extension and a continuance of this inflammation in these bony foci. This is strongly supported by the appearance of the focus around the stapes of the right side, in which can plainly be observed the progress of the otitis from the anterior portion of the niche, forward to the periphery of the cochlea, and backward to the crest of the external semicircular canal. Doubt as to the origin of this focus by continuity of the inflammation from the lining of the middle ear can arise only in regard to the focus in the wall of the internal meatus. Yet since similar pathologic sclerotic changes are found in the bone between this focus and the wider pneumatic cells connected with the tympanic cavity, at the anterior inferior periphery of the cochlea, the continuity of the inflammation from these cellular spaces to the bony wall of the meatus is likewise possible, although I must assume from the histologic picture that it is probable that this focus took its origin from the periosteum of the internal meatus.

That all these foci existed at the same time, at the beginning of the disease, can no longer be proven; at least so far as the foci in the niches of the windows, it seems more probable that there were later exacerbations of the process. The findings at the oval window speak for a long continued, superficial ulcerative process at this place.

According to the history, the disease began about 30 years before the death of the patient, and then grew gradually worse. The explanation for this increasing deafness is plainly

found in the changes in the niches of the windows, especially in the stapes and its articulations, in the bilateral changes in the anterior portion which are old and have ceased, and which probably reach back to the beginning of the disease, while the posterior portion shows fresh ostitic changes, which pass over to the base and cause bony ankylosis. Only the latter, which brought about a complete immobility of the stapes, could cause the high degree of deafness which was found before the death of the patient.

These observations are the more important, since, in spite of the ankylosis of the stapes, the patient heard the voice at 1 m. distance right side, and one half m. left, and on the right side heard whisper, also, at 2 cm. distance, and the possession of these remnants of hearing can well be explained by the fact that a large part of the membrane of the round window still functionated. This case is in sharp contrast to one described by me in a previous number of this journal* where there was found, with a complete occlusion of both round windows, good hearing on the side where the stapes was still movable.

CASE IV.

George Sch., 27 years old, was brought, July 2, 1893, unconscious to the nerve clinic, and died there the next day. In regard to his disease, there could be learned only that, one day before, he was seized with a spastic paresis of the left upper extremity, which became somewhat better in the evening. Nevertheless general convulsions and unconsciousness supervened, on which account he was brought to the hospital the next day. It was said, also, that he suffered with his right eye and left ear, and several days before had taken a large dose of potassium iodide on account of his eye trouble. Previously he had had a squint in his right eye, which condition had become worse in the last few weeks. I can pass over the findings on his entrance to the nerve clinic, as they had no direct connection with his ear trouble, and will add only that a test for hearing could not be made, but that ac-

*Archiv. für Ohrenkeilkunde, Bd. LIII. S. 61.

cording to the belief of the physician who treated him, the patient could hear well.

The necropsy was held July 5, in the pathologico-anatomic institute and the pathologico-anatomic diagnosis was: Arteritis of the internal carotid. Progressive thrombosis of left internal carotid. Multiple encephalitis left hemisphere; post necrotic thrombotic cyst of the right hemisphere; meningitis dispersa, cerebral compression, lobular pneumonia.

As there was supposed to be an ear affection on the left side, Eppinger gave me the left temporal bone for further examination. On cutting the bone I found the pars petrosa comparatively small, the internal meatus abnormally wide, measuring at its internal end 9 mm. in breadth, and 8 mm. in height. The drum white and thickened, and showed a large perforation posterior inferiorly, which also reached into the posterior superior and posterior quadrants. The bone of the temporal bone was very sclerotic, the antrum mastoid very small, and few cells were to be found in the mastoid, near the antrum. The mucous membrane of the middle ear appeared greatly thickened and swollen, and covered the windows and the large ossicles.

MICROSCOPIC FINDINGS.

INTERNAL EAR.—The dilatation of the internal ear extended outward as far as its end, and the usual thick bone between the ganglion canal and the internal meatus had almost disappeared, so that the internal meatus reached nearly to the ganglion canal of the middle turn of the cochlea. At the bottom of the meatus the measurements were 7 mm. Likewise the canal for the vestibular and facial nerves were very much widened, the latter to its entrance into the middle ear. The periosteal covering of the meatus was thickened and contained numerous spindle cells. The nerves were comparatively thin, and contained considerable blood in their sheathes. Between the bundles of the vestibular nerve, especially between those of the branches to the posterior ampulla, were numerous round cells and leucocytes. Signs of them were also found between the bundles of the cochlear and facial nerves. In the cochlea, considerable pigment was

seen, which was present in large amounts in the stria vascularis and the lamina spiralis of the middle and upper turns, and in smaller amounts in the endosteum and ligamentum spirale. Fresh hemorrhages were visible at several places on the lamina spiralis. The parts of the cochlea, especially the organ of Corti, are very well retained, though they appear in general somewhat more delicate and less well developed than usually. The nerve fibres in the end portion of the basal turn are evidently smaller, and there is more connective tissue here and in the ganglion canal around the nerves and ganglion. The aqueductus cochlearis, like the internal meatus, is very wide, especially its inner half, but its outer half plainly, also. There are no special pathologic changes in the vestibule and semicircular canals with the exception of somewhat numerous and profuse hemorrhages.

MIDDLE EAR.—The mucous membrane of the tuba Eustachii shows a great development of folds, and there are present numerous larger or smaller foci of inflammatory infiltration. Only a few sections of the drum are good for examination.

In these are seen a large involution of the border, a large cicatrix at the border of the membrane, and a severe inflammatory infiltration of the mucous membrane with separation of the layers. The lining of the middle ear is inflammatorily swollen and infiltrated to a high degree, along the entire inner wall. Only in the regions of the windows and on the inferior wall are the conditions somewhat different since here the deeper spaces are filled out with a loose connective tissue, and only the superficial layers of the mucous membrane, or only several broad or rounder foci are infiltrated with round cells. Similarly infiltrated are some cone like projections on the inferior wall. Most of the epithelium is retained and only at the places of greatest infiltration is it no longer to be seen. The niche of the oval window is filled out with loose connective tissue which is sprinkled with large swollen cells, occasional round cells and leucocytes. Between the bars of the stapes is a large cystic space. The bars are very narrow, stain deeply with hematoxylin, but their bony structure is no longer demonstrable. Very irregular conditions are found in the base of the stapes, whose bone has almost entirely disap-

peared, while the annular ligament shows numerous spindle cells, and in places is calcified. At the anterior, superior edge, the annular ligament borders directly on the diseased bone, and here the most internal portion of the anterior stapedial bar is bound fast to the bone.

The anterior portion of the round window is stenosed by a hyperostosis of the bony wall, and this hyperostotic bone has the same structure as the promontory. The remaining portion of the anterior half of the round window is filled out by thick connective tissue in which several cyst like spaces are enclosed. The posterior half of the niche is free, but its mucous membrane lining like that of the middle ear shows great inflammatory infiltration, is and likewise the membrana tympani secundaria on its external aspect. The sinus tympani shows only a small lumen, and otherwise is filled out with dense fibrous tissue, that in its superficial portion is somewhat infiltrated. The lining of the antrum mastoideum is similar to that of the middle ear.

THE BONE.—The pars petrosa is somewhat smaller and, as mentioned above, the canals connected with the cranium, viz.: internal meatus and aqueductus cochlearis, are enormously dilated, the latter nearly to its junction with the cochlea. The bone shows everywhere manifest sclerotic changes, very few cells, an intense staining with hematoxylin, and a scant staining with eosin, which allows the conclusion that there is an increased amount of calcareous matter. The mastoid shows only a few small cells below the antrum, and it, as well as the squama, as far as the latter was examined, is sclerotic with a few small cellular spaces filled with loose connective tissue and wide vessels.

The bone of the internal wall of the promontory is especially altered. Everywhere under the periosteal layer of the mucous membrane are short and wide canals in the bone, in which is only scant or no connective tissue. The superficial bone lying between stains unusually deeply with hematoxylin especially in the anterior part of the middle ear, up to the niches of the windows. In addition to these old changes in the bone, a fresh ostitic lesion at the same place as in the above described cases is found in the anterior circumference of the stapes. It extends from the oval window

into the promontory forward and ends here between the posterior border of the middle turn and the end of the basal turn of the cochlea. Outward, it reaches, for the most part, the periosteum, inward to the endosteal covering of the sacculus rotundus, while upward it is separated from the facial canal by a small, still normal layer of bone. Posteriorly it surrounds the fenestrum ovale, and ends at the inferior border even before the middle of the niche, while at the superior it stops just before the posterior border of the niche. This lesion resembles exactly the foci in the previous cases. The whole bone, as far as it is diseased, is traversed by large, partially round, partially more oval spaces, in which are very dilated vessels, granulation cells, in places large multinuclear osteoclasts and more often layers of osteoblasts along the walls. The place of the bone is taken by a simple osteoid tissue, in which, at isolated centrally lying places, are still to be seen long remnants of old bone. Stained with hematoxylin, they show an indistinct structure, without distinct bone corpuscles. In some of the spaces which contain vessels, we find, close to the vessels, some cells with deeply staining nuclei, like the lymphocytes. The diseased bone at the border of the foci is sharply defined from the healthy, and it seems that a part of the wall of the vessel space borders directly on the healthy bone. Here the bone corpuscles at places in the healthy bone show themselves altered in so far that their lumen is somewhat widened and the bone cells in them are plainly visible. This gives the impression that the process consists not only of a resorption of the old bone by osteoclasts and formation of new by osteoblasts, but also of a reconstruction of the old bone, in which the cells of the old bone at the same time play an active part. It must still be said in regard to the entire lesion, that the disease in its entire extent is comparatively fresh, and that nowhere are sclerotic portions nor such as show canals filled with medullary or old connective tissue. The most numerous, and therefore the freshest, are in the disease portion at the anterior periphery of the lesion, and at the posterior part, in the circumference of the stapes, where a part of the stapes and the annular ligament is affected by it, so that a bony ankylosis could have been expected if the disease had lasted longer.

In this case, pathologic changes of different durations and kinds were found in the temporal bone. The abnormal smallness of the temporal bone and its extremely sclerotic bone, together with extreme dilatation of its internal meatus and a large part of its Fallopian canal presumably was caused in the early period of patient's life, and the patient at this time probably suffered from hydrocephalus and rachitis. When the purulent otitis media appeared, which caused the perforation of the drum and the changes in the mucous membrane and superficial bony layers of the internal wall of the middle ear, cannot now be told, as the history is silent on this point. Finally there is the third change, viz.: the fresh ostitic lesion in the neighborhood of the oval window, in regard to whose origin several theories could be advanced. To consider it as the sequel of the otitis media purulenta does not seem correct according to the other findings, and when I demonstrated the specimen at the 7th German Otologic Congress at Würzburg, I advanced the theory that it was a disease of the bone due to syphilis, since definite signs of syphilis were found both from the history and from the necropsy.

I can refer to a case of Schwabach* at Würzburg in which similar signs of syphilis were present, although Schwabach himself did not seem to give this construction to his case.

CASE V.

Ch. Magdalena, 34 years old, workingmen's wife, from Graz, was brought to the obstetric clinic, January 4, 1896. Labor had commenced 48 hours before, and the patient had been examined several times by the midwife. She was suffering with fever (38.2°), there was a cross presentation, prolapse of the umbilical cord, and living child. After podalic version the patient was free from fever for four days, when the typical symptoms of puerperal septicemia set in, from which the patient died on the 8th day of the disease, on the 11th day after delivery. The patient was very deaf, but could not tell exactly when the deafness first began. During preceding

*Zeitschr. f. Ohrenheilk., XXXI., P. 122.

pregnancies (I 1893, II 1894) the deafness increased. Tests for hearing were not made, and I could establish only that one had to shout to her before she could understand. Her husband, whom I subsequently questioned about the ear trouble of his wife, was suspicious and evaded every inquiry; he insisted he knew nothing of his wife's aural trouble.

The necropsy on January 15, 1896, in the pathologic anatomic institute, gave body small, weak, abdominal wall inflated. Brain substance soft, delicate, rather rich in blood, ventricles fairly wide, cerebellum similar to cerebrum. Subcutaneous tissue without fat. Heart small, cavities narrow, musculature brown, fragile, valves correspondingly formed. Left lung large. Pleura delicate, upper lobe contains air, pale and streaming with frothy liquid. Lower lobe sprinkled by confluent hepatised foci. Bronchi reddened, covered with tenacious mucous. Right lung likewise large, much fibrinopurulent exudate in the pleural sac. Tissue of upper lobe contains air, edematous; the lower lobe atelectatic. Throat organs show nothing abnormal. Peritoneum covered with a mass of pus as are the loops of the gut, which are adherent to one another. Spleen large, capsule delicate, tissue greyish brown, pulpaceous. Both kidneys large, very brittle, pale and fatty colored. In stomach large amount of contents, mucous membrane in longitudinal folds, reddish grey colored. Scanty contents in intestinal canal. Mucous membrane in places reddened and swollen. Liver large, very heavy, brittle, yellowish colored. In the bladder, a little cloudy urine, mucous membrane somewhat reddened. Uterus very large. Inner surface covered with dirty, foul mass. Placental attachment necrotic. Tissue of the uterus friable, the lymph vessels filled with pus. Ovaries greatly increased in size, tissue moist and reflecting, grey. In them, are several foci, size of lentil, containing thickened pus.

DIAGNOSIS.—Peritonitis purulenta, pneumonia lobular; atelectasis pulm. dextr; pleuritis dextr; metrolymphangitis; endometritis; ophoritis ascendens; sepsis puerperalis.

In the right temporal bone, which I obtained for examination, I found the epidermis in the external meatus detached in a large lump (the specimen had been lying in Müller's fluid); in the middle ear and antrum, mucous secretion. The

bone, on sawing, was very hard, the antrum comparatively small, and only a few pneumatic cells were to be found behind it. While separating the squamous portion from the petrous, the drum was unfortunately torn, and the largest part remained on the inner portion, while only the anterior, smaller part on the outer. The mucous membrane of the ossicles, the antrum and the middle ear, as far as could be seen, seemed to be greatly thickened. The recognition of the condition of the mucous membrane was rendered difficult by the action of the Müller's fluid.

After decalcification of the specimen in nitric acid, the microscopic examination was made.

MICROSCOPIC EXAMINATION.

INTERNAL MEATUS.—Of the nerves, the greater part of the right cochlear and a large part of the vestibular was wanting in the specimen. In the remaining parts, there were considerable venous hyperemia and large hemorrhages between the external nerve sheathes, and small punctate between the nerve bundles.

COCHLEA high degree of venous hyperemia, and a considerable amount of pigment in the periosteum of the scala vestibuli. In the reverse portion of the basal turn, a large stretch of the ganglion spiral was wanting as well as the nerves belonging to it and the corresponding organs of Corti, while the stria vascularis, promentia spiralis and Reissner's membrane were retained. In the lamina spiralis there were only pigment, scant connective tissue and a few fat droplets, in Rosenthal's canal considerable connective tissue at one place, in the remainder only scant connective tissue and some fat droplets, Corti's organ failed for a wider stretch than the spiral ganglion, as it failed even where a few ganglion cells were visible. In the lowest part of the cochlea, the organs of Corti were well preserved, but even here in the ganglion canal, a lessening of the nerve cells and an increase in the connective tissue were to be observed.

Nothing pathologic was to be seen in vestibule and semicircular canals.

EUSTACHIAN TUBE. The mucous membrane of the cartila-

ginous tube is rather thickened, and in places there is a more intense accumulation of round cells and in places numerous formative and spindle cells.

The middle ear is for the most part filled out with dense connective tissue with a few spindle cells, and a richer, homogenous intercellular substance, and this connective tissue is connected with the lining of the internal wall, which likewise is extremely thickened, but which is entirely distinct in structure. It contains numerous vessels and cells, especially spindle cells, and some long cyst-like spaces, lined with cylindrical epithelium, which are larger and more numerous in the connective tissue which fills out the niches of the windows. They are filled with mucous and degenerated cells. Still larger and more numerous are the cysts along the inner wall, and they are often so arranged that a large number lie side by side, separated from one another only by a thin wall. The space in the posterior half of the middle ear has disappeared except for the spaces mentioned. The anterior half is somewhat different. The middle of the drum is adherent to the internal wall and so shuts off the anterior, inferior portion of the middle ear, in which, however, the mucous membrane is likewise thickened by hypertrophy of the connective tissue, and there is also found in it numerous, cyst-like spaces, round on cross section, which permeate the entire mucous membrane especially in the inferior internal wall of the middle ear. The drum shows a cicatrix in the superior anterior quadrant; the substantia propria is lacking and the epidermis borders directly on the connective tissue that fills the middle ear.

As to the chain of ossicles, the long process of the anvil and the stapes are surrounded by connective tissue, and the manubrium of the hammer is bound to the promontory by connective tissue. In the joints between the hammer and anvil, and between anvil and stapes, the articular cartilage is calcified, especially on the stapes. Large masses of chalk are deposited in some of the medullary spaces of the body of the anvil. The posterior bar of the stapes is retained, but is adherent by means of connective tissue to the posterior wall of the niche; only remnants of the anterior remain.

All of the inner two thirds is destroyed except a few calcareous remnants in which no bone corpuscles are to be found, and these are surrounded by dense connective tissue, and entirely enclosed in an exostosis having its origin in the niche.

The antrum is divided by connective tissue septa into a number of small spaces, all of which are filled with mucous or mucous swollen epithelium. The mucous membrane lining of the antrum as well as that of the surrounding and even distant pneumatic cells is extremely thickened by new-formed connective tissue, and in some of the cells of the neighboring bone are osteoblasts and clear, eosin-staining areas of new-formed bone.

The bone was pathologically altered in several ways. In the first place, there was an unusually high position of the bulbus jugularis, and thereby the bony floor of the middle ear was reduced to a thin plate, which at places showed large holes in the bone. Furthermore, the bulbus had caused the disappearance of a part of the pars petrosa, and reached to the under border of the promontory, posteriorly to the ampulla of the posterior semicircular canal, which was separated from the bulbus by a layer of bone as thin as a sheet of paper. Then, there was a somewhat large hyperostosis of the promontory which began just at the annular ligament of the stapes and gradually increasing in circumference reached to the inferior border. Here excrescences (osteophytes) projected still further downward, which partially obstructed the passage to the niche of the round window from without and above. The new formed bone was periosteal bone, and showed in the middle, at about the height of the round window, a hole that was filled with a fibrous connective tissue rich in cells. Internally these hyperostoses as well as a similar one on the under wall, narrowed the niche of round window very much, and the small remnant of the window, as already described, was filled with connective tissue. Such a stenosis of the niche of the window by hyperostoses of the bone is not seldom seen, and has been described by me before. The new-formed bone is scarcely distinguishable in its structure from the other periosteal bone of the labyrinth capsule, only staining somewhat deeper with eosin.

Decided disease of the bone was found in the niche of the oval window. In connection with a chronic inflammation lesion in the bony, there are seen here, on the surface, several large broadbased exostoses which have developed as follows: one outward and downward from the inferior border of the base of the stapes, the second, on the same side above the stapes, and the third from inferior, external border of the bony facial canal. The lesion in the bone corresponds to the anterior end of the base of the stapes, and below has a breadth of 4-5 mm. surrounds the base of the stapes at the anterior third, and extends from the middle ear to the periosteal lining of the vestibule, or the end of the basal turn of the cochlea.

Only the anterior part of the base of the stapes is affected with bony ankylosis; elsewhere the joint is free and the exostoses are found only in the niche above and below, and they posteriorly become smaller and smaller and lie even further outward.

The diseased bones show greatly dilated vessel channels, traversed by wide vessels, in whose vicinity are numerous formative cells, in some places large multinuclear giant cells, osteoclasts, and in places also osteoblasts. The bone nearest to the canals consists often only of osteoid tissue, which, especially in the middle of the lesion has entirely replaced the vanished bone. The diseased bone is everywhere sharply differentiated from the healthy, and at the promontory a few dilated channels run downward, which are bordered at their peripheries by layers of osteoblasts and osteoid areas. At the superior border of the focus are irregular round protrusions of the diseased into the healthy bone and at the anterior border of the focus, at the posterior periphery of the superior turn of the cochlea are numerous, irregular masses of calcium salts in place of the old bone.

The bone in the vicinity of the drum and meatus was little altered; at the periphery of the bony tube, and at the posterior inferior part of the pars petrosa, it was very osteoparetic with wide medullary spaces. In the posterior part of the pars squamosa, toward the antrum, and at the superior wall of the middle ear, were large spaces in the bone, filled out with a cellular infiltrated, inflammatory connec-

tive tissue. At their peripheries were beautiful osteoblasts and new formed layers of bone.

Since nothing certain about the ear affection of the patient could be learned from the anamnesis, we must make our judgment from the anatomic findings alone. According to that, it was a case of long continued inflammation of the middle ear, which caused a perforation and later a cicatrix of the drum, filling the middle ear and part of the antrum with connective tissue, and in places lesion of the superficial bone. Worthly of note was the larger focus of inflammation in the bone of the anterior periphery of the oval window, which, starting here, reached to the wall of the vestibule and the basal cochlear turn, and caused bony ankylosis in the anterior third of the base of the stapes. This focus showed, in the periphery of the oval window, comparatively old otitic changes, which became fresher the more anteriorly they were, so there can scarcely be any doubt that it took its origin from the anterior portion of the niche of the oval window, and progressed from here gradually forward to the vicinity of the vestibule. As a whole, however, the otitic lesion cannot have lasted a long time, since all the changes are of a comparatively young kind.

Of special note are the filling out of the middle ear* and niches of the windows with connective tissue, and the numerous, cystic spaces in the middle ear and antrum, which, lined with cylindrical epithelium, are to be regarded as remnants of the original middle ear—mastoid cavity, furthermore the extreme thickness of the floor of the middle-ear, and the bone of the inferior wall of the posterior semicircular canal caused by the high position of the bulbus jugularis, and, finally, the changes in the end portion of the basal cochlear turn. The explanation of the disappearance of the ganglion cells, and the increase of connective tissue in Rosenthal's canal could best be explained by the supposition, that the

*An obliteration of the middle ear by connective tissue which von Tröeltsch has already described (these archives Bd. VI, p. 73) has been observed by me and portrayed in Schwartz's Handbook Bd. I, p. 253, Fig. 8, so that Holzel's statement (Zeitsch f. Ohrenheilk, Bd. XLIII, p. 176) that there is nothing about it in the literature is incorrect.

widespread inflammation in the middle ear had also attacked the end portion of the basal cochlear turn.

CASE VI.

Marie M. 76 yr. old widow, was examined at the medical clinic where she was being treated for carcinoma of the stomach. She said she had suffered from deafness for 20 years, yet could tell nothing definite about its cause. Nothing could be found out about other ear symptoms from her as she could neither read nor write.

The drums, which consisted of white scars, were greatly retracted, with extensive cloudiness and bending of the borders. The left drum was the whiter. The mucous membrane of the nose was pale red, the right lower turbinate somewhat atrophic, and there was a large amount of mucous secretion. The posterior pharyngeal wall showed numerous granulations, and considerable mucous was also found in the naso-pharynx. Test for hearing gave a negative result in both ears with every method, watch, voice, all the tuning forks with the single exception, that on the left side, the deep tuning forks c^1 , c^3 were still heard by bone conduction. The deep and large tuning forks C, C_1 , C_2 , were unfortunately not tested for bone conduction, but could not be heard by air.

The patient died as a result of her stomach cancer, February 2, 1896, and the necropsy was made February 3, in the anatomico-pathologic institute.

Post-mortem findings of February 3, 1896. Body small, slight frame, emaciated, abdomen greatly distended, greenish discolored. Cranium large, roundish oval, compact. Meninges rich in blood, pia greatly thickened, brain substance friable, soft, cortex atrophic. Medullary substance permeated by points of blood which were easily wiped off. Ventricle dilated, filled with clear serum. Cerebellum more friable than cerebrum, vessels at the base very rigid. Pons and medulla strong and tenacious. In the basal sinus was dark, clotted blood. Subcutaneous areolar tissue devoid of fat. Heart small, inclined, contracted, cavities narrow, muscle friable. Valves correspondingly formed. Both

lungs large, light, pleura delicate, upper lobes contain air, pale and emphysematous at the borders, on section covered with a frothy liquid, the lower lobes containing numerous hepatic foci. In the bronchi tenacious mucous, mucous membrane greatly injected. Mucous membrane of pharynx of livid color, that of the esophagus and trachea pale and smooth. Thyroid gland enlarged. Spleen small, tissue red brown, pulp scanty. Both kidneys small, surface smooth, tissue red brown, firm, tough. Stomach very wide, filled with fluid products of digestion, mucous membrane in fundus ecchymotic, smooth, the pyloric region is occupied by and its tissue incorporated in a tumor of about size of fist, which consists of soft, pale gelatinous tissue and so narrows at the pylorus, that it scarcely allows the little finger to pass through it. The large omentum is studded with larger or smaller nodules of gelatinous tissue, as is the under surface of the diaphragm. The other organs show nothing abnormal.

Diagnosis, carcinoma gelatinos. partis pylorici cum metast. in oment. maj. et diaphragma. Marasmus.

The temporal bone which was given to me by Eppinger, for examination, showed the following findings.

RIGHT EAR.—The mucous membrane of the tube and anterior and inferior half of the drum thickened. The hammer-anvil articulation movable. The niche of the round window entirely overgrown with tissue, the lower part of the round window also. The bars of the stapes are very thin. The mastoid process very pneumatic, and the pneumatic cells reach far backward beyond the area of the sulcus sigmoideus. The bulbus jugularis is also very extensive.

LEFT EAR.—The drum thickened, greyish white, somewhat transparent at the anvil. The mucous membrane of the middle ear thickened on the inner wall, the niche of the round window for the most part overgrown, that of the oval narrowed from below, and the anterior bar of the stirrup ankylosed with the inferior border of the thickened wall of the niche. The bars of the stirrup are very thin, and the niche above the bar is free. The mastoid process very pneumatic, and apparently not pathologically altered.

The specimens were, as usual, after fixing in Müller's fluid, decalcified in 5 per cent. nitric acid solution and examined microscopically.

MICROSCOPIC FINDING.

RIGHT EAR.—INTERNAL EAR.—In the specimen, only remnants of the nerves in the internal meatus are to be found; the remainder was torn off in removing the brain from the cranial cavity. With the exception of hemorrhage into the sheathes these remnants show no pathologic changes.

In the cochlea, the nerves and ganglion cells in the superior turns are well retained; in the basal, the number is greatly lessened, and the vicinity of the ganglion canal is greatly calcified, and the connective tissue increased in the canal itself. Both sheaths of the spiral lamella of the basal turn are changed into masses of chalk, in which no bone structure can be made out, and the space between them is very much narrowed. The organs of Corti show no unusual changes; only in the basal turn are the cells less well retained. The periosteal covering of the scalae and the external portion of the ligamentum spirale, where they border on the diseased bone, are more or less greatly thickened, and the latter especially in the superior turns, is changed at places into a thick layer of connective tissue deeply staining with eosin. In the vicinity of the venous channels in the basal turn, as well as in the cellular spaces in the cochlear spindle, the bone contains large amounts of chalk, and similar changes extend upward into the dividing wall of the inferior and middle turn. The aqueductus cochlearis is stenosed at its external part, where it empties into the cochlea, and further inward entirely closed. Within the diseased bone remains of connective tissue and some particles of calcium phosphate represent the former canal. The medial end of the canal is retained. At the inferior part of the scala tympani, the diseased bone projects into the cochlea in the form of a rounded exostosis, and here the basal membrane is detached at a circumscribed place from the spiral band.

No pathologic changes are to be found in the vestibule and semicircular canals in spite of the extreme changes in

their bony walls. The walls of the semicircular canals show some small prominences of diseased bone which project into the lumen; the endosteum is in places somewhat richer in cells and thickened.

MIDDLE EAR.—The lining of the bony tube (the cartilaginous fails on the specimen) shows a sclerosis in the superficial layers. In the tympanic cavity the lining consists of fibrous connective tissue with considerable intercellular substance and few nuclei, and only in spots is an infiltration of spindle cells. In places this thickening of the lining attains a higher degree, especially in the niches, which are closed by fibrous connective tissue where they are not already narrowed by diseased bone. Only in the anterior superior part of the niche of the oval window does there remain a part of the lumen, in spite of the thickening of the lining and connective tissue adhesions.

The drum, as a whole is somewhat thickened; especially at the anterior border, and its mucous membrane layer is formed similarly to the lining of the tympanic cavity. The dermal layers consists of a thin layer of fibrous connective tissue, while the substantia propria shows no change. A special thickening of the lining is found immediately over the drum at the external side of the attic. The bony wall here is uneven, with excavations, with sharp projecting spiculae, between which the thickened lining dips in.

Of the ossicles, hammer and anvil show similar changes to the neighboring bone of the external wall of the middle ear, dilated medullary spaces and vessel channels, new formation of bone, and deposit of chalk in the articulation, the latter also being present in the anvil-stirrup articulation. The stapes has very slender bars externally; inwards, the anterior is firmly bound to the wall of the niche, the posterior partially so. The latter shows furthermore a superimposition of a thick layer of greatly calcified bone. The anterior part of the base is thickened from without inward, by a hyperostosis similar to that of the posterior bar. Internally, the bone shows signs of chronic inflammation, filling out of medullary spaces present with the connective tissue. The posterior part of the base is firmly attached to the surrounding bone (bony-ankylosis); nothing can be found of the annular ligament.

and the same pathological changes are found as in the bone of the petrous portion. The anterior part of the base of the stapes is dislocated out of its articulation outward, for about the thickness of its base, and there bound by bony adhesions to the diseased bony wall. Its bars and head are bent downward, enclosed in fibrous connective tissue and adhering to the wall. The larger vessels along the *tensio tympani* and *nervus petrosus* shows clearly thickening of the intima through endarteritis.

The mucous membrane of the mastoid process shows a looser structure than that of the middle ear, and, as far as the disease of the bone reaches, is denser and contains numerous spindle cells. Some small cells are entirely filled out with connective tissue.

BONE.—The bone was diseased for a great extent, and a part still is. In general it can be said that so far as it borders on the tympanic cavity, it shows pathologic changes of greater or less breadth, and that the greater part of the bone surrounding the semicircular canals is diseased. In the anterior part of the tympanic cavity, the disease of the bone reaches about 4 mm., into the bone of the internal wall, attacks certain turns of the cochlea and extends to the anterior periphery of the internal meatus, which is involved for a large extent in the process. Further posteriorly, the internal border is found at the periphery of the sacculus and utriculus, where the points of nerve entrance are likewise partially surrounded by diseased bone. The deepest point of the disease is the region of the semicircular canals where it has attacked the bone in the region of the *acqueductus vestibuli* and also a part of the vicinity of the semicircular canals. Furthermore, the entire bony floor of the middle ear, a large part of the bony capsule of the *bulbus jugularis*, as well as the vicinity of the bony tube and *Haller's space*, and the parts of the external meatus adjoining the middle ear are pathologically affected in a similar way. I can make no statement about the superior wall of the middle ear or the external part of the mastoid process, as these were not examined histologically.

In spite of this apparently diffuse process, with careful examination, there can be found the same foci in the bone as in

the other cases, only on account of their great extent they have fused with one another. The lesion in the internal meatus shows the bone ulcerated for a great distance, and a little fibrous connective tissue lies in the cavity, whose floor seems irregularly bitten out. The adjoining portion of bone show somewhat larger vessel channels, and everywhere sclerosis with deposit of calcium salts. There is a new focus which begins broad at the inner wall of the aditus, and surrounds the external semicircular canal, from without inward, and a second, deeper one, in the region of the sinus tympani, which internally surrounds the posterior semicircular canals and affects the entire bone of this part up to the external wall of the aqueductus vestibularis and comes to an end only at the upper periphery of the petrous pyramid. In this most superior part, the disease appears the most acute. Here the disease of the whole floor of the tympanic cavity is evident. The bone here shows a deep bluish-yellow stain (hematoxylin eosin) and is apparently, as a whole, dense, with hypertrophy of the connective tissue, in the cellular spaces, as in the medullary spaces, layers of osteoblasts on the bright red internal bony wall are found. Close to the older bone, with plain lamellar formation and dark blue staining, is bluish red bone, with less distinct lamellation, and greater prominence of the bone corpuscles, and superficially, around the bony borders, faintly staining layers with rows of osteoblasts.

LEFT EAR.—In the internal meatus, there are also hemorrhages between the nerves, and the periosteal covering, where it borders on the diseased bone, is thickened and permeated by numerous spindle cells. In the cochlea, the nervous apparatus is well retained, and the endosteum of the end portion of the basal turn greatly calcified. The diseased bone projects in the form of an exostosis into the lumen of the scala tympani, and the apical turn. The aqueductus cochlearis is partially interrupted by fibrous, calcified connective tissue. From the apex of the cochlea, and from its sides, the disease of the bone has advanced into the spiral of the cochlea, and furthermore, the bone in the neighborhood of the medullary spaces of the cochlear spiral is very calcified. The ligamentum spirale bordering on the diseased bone, is, as in the right ear, greatly thickened.

The same conditions in vestibule and semicircular canals as on the right side; an alteration in the part of the external semicircular canal bordering on the antrum is noteworthy, as it has a more acute form, owing to the reaching in of the diseased bony wall.

MIDDLE EAR.—The mucous membrane lining is similarly constructed to that of right. The niches differ somewhat. The lining of the niche of the oval window is markedly thickened, but the lumen is otherwise rather free. The posterior bar of the stapes, whose bone is greatly calcified and no longer shows bony structure, adheres, to a large extent, to the niche's wall by fibrous connective tissue, while the anterior bar is displaced somewhat outwardly with the corresponding part of the base, and here likewise appears firmly bound to the wall of the niche. The cartilaginous layer of the base of the stapes is retained for the larger part of the periphery, although partially calcified, and the greater part of the annular ligament has the same appearance, but the cartilaginous layer of the wall of the niche is for the most part lost, while the diseased bone reaches more or less into the base of the stapes.

In the posterior superior part there is a complete bony ankylosis of the base with the pars petrosa. The base, in its middle and posterior part is very thin, consisting especially of the cartilaginous layer internally to which as the thin calcified connective tissue layer, and externally a thin layer of calcified structureless tissue.

The anterior part of the niche of the round window is somewhat stenosed by exostoses of the diseased bone, and the lumen is completely filled out by fibrous connective tissue in which remain small spaces lined with epithelium.

In the most anterior internal part, this tissue is somewhat less dense and shows wider spaces in the network. The posterior part of the niche is completely closed by bone. Hammer and anvil in this ear scarcely altered.

The bone on the left side, in the region of the tympanic cavity is diseased similarly to the right. Around the tube, the bone is extremely osteoporotic, with numerous medullary spaces and large vessel channels which show at their periphery spaces of osteoid tissue. Spaces entirely filled out with

connective tissue are found here with borders often jagged and irregular.

Beneath the cochlea and vestibule are large pneumatic spaces, whose lining of mucous membrane is thickened and impregnated with numerous spindle cells and in whose vicinity, as in the entire periphery of the middle ear, the bone shows itself diseased into its depths, as in the right side. In aditus and antrum are also found some circumscribed ostitic lesions on the superficies of the bone, and likewise deeper ones in the region of the superior and posterior semicircular canals, which are apparently isolated, but in reality the upper are in communication with the diseased medullary spaces of the upper face of the pyramid, while those around the posterior semicircular canal are joined with the especially well developed cellular spaces in the inferior part of the posterior face of the pyramid.

In the internal meatus is a large hole in the bony wall, somewhat larger than on the right side, with very uneven jagged floor, and the periosteal lining over it is destroyed. On the floor of the hole, some fibrous connective tissue lies on the greatly diseased bone, which is traversed by large vessel channels filled out with fibrous connective tissues, rich in spindle cells, and surrounded by a completely sclerosed bone. In some larger vessels, e. g., the artery of the fossa subarcuata there is an evident thickening of the intima by endarteritis.

REVIEW.—The most important feature of this case, which distinguishes it from those previously examined, is the extreme extent to which the bone of the entire surrounding of the middle ear is involved although the disease has not everywhere penetrated to the same depth in the bone, starting from the middle ear. Furthermore, it is noteworthy that not only the same appearance of the diseased bone, but also another circumstance argues for a similar disease of the bone in this and in the preceding cases. An exact examination of the specimens shows that the disease took its origin from the same places in this as in the other cases, and thence spread, only here the foci have fused on account of their greater extent, and the other walls of the middle ear, the antrum and the tube were similarly diseased. The dis-

case of the bone in this case, also showed at different places an altered histologic picture. Thus, especially at the borders, completely sclerotic parts were found near others in which the bone showed very dilated vessel channels, which, after Siebenmann, can be called spongy. Near those parts in which the disease had years before come to an end, places were visible, where there were plain signs of an acute progressing disease. The distribution of the freshly diseased parts and the old retrograde changes agreed in the main with the theory that I advanced in the former cases. The picture on the under wall of the middle ear and the vicinity of the bulbus jugularis is somewhat different from that of the other petrous portions, and here resembles rather that which we observe in the purulent middle ear inflammation. These differences can possibly be due to the different structure of this bone and less to another cause of disease.

As to the duration of the trouble, we can assume from the statement of the patient that she was deaf for 20 years, that the disease of the bone which we must regard as the cause of the deafness, on account of the change at the windows, lasted at least that long if not longer.

Of the changes, special note must be taken of the luxation of the stapes outward which was caused by the inflammation destroying the connection of the base of the stapes with the bone, or changing it into a loose new connective tissue, so that the stapes obeying the pull of the muscle, was directed outward and then became firmly bound to the wall of the niche.

The complete deafness of the patient in the right ear, and nearly complete in the left finds its explanation not only in comparatively insignificant changes in the labyrinth, but, as I have pointed out in other cases, can be referred to the closure of the niches of the window and the fixation of the stapes. What influence on the hearing the bilateral occlusion of the aqueducti cochleares had cannot be determined on account of the large number of weighty lesions which were present. It seems that the communication between perilymph and sub-arachnoideal space through the internal meatus can allow a partial occlusion of the aqueductus cochlearis. Why, in the left ear, the deep tuning forks c^1 , c^2 , c^3 , (unfortunately no

test was made with the deeper ones) were still heard by the bone conduction from the mastoid, can be explained in my opinion by the fact that on the left side, not only was a large part of the annular ligament of the stapes retained, but also because the base of the stapes for a considerable space consisted not of bone but of a thin cartilaginous layer, over which, externally, the lining of the middle ear lay.

Whether the patient in earlier life suffered from dizziness could not be found out, as she was deaf and could not read, but it is not improbable that she had attacks of dizziness like the other earlier case where the disease of the bone reached to and involved the passage of the ramus vestibularis.

CASE VII.

Marie B., 28 years old, property owner's daughter, suffered from infancy with epilepsy, and intense excitability, especially at the time of menstruation. In her home certificate she is designated as an idiot. She spoke few words, but the doctor who treated her in the hospital said her hearing was good. Three weeks before she had given birth to a healthy child and died in an epileptic attack, with which in the last weeks she had often suffered, and as a result of which, before her death she was unconscious for days.

Post-mortem April 13, 1899, in Prof. Eppinger's-pathological-anatom. institute.

Body small, rachitic build, thin. Skin earth-colored, lower portion of the abdomen wrinkled, covered with striated grooves; nipple region and linea alba very pigmented; pericranium sprinkled with some very circumscribed, fresh, macular hemorrhages. Pia of the base of the brain congested to the highest degree, the vessel walls delicate. Cranium rather small, long oval, thick at the base (12 mm.) everywhere clearly compact. The dura adhered firmly, somewhat thicker, and congested. In the superior transverse sinus, fluid, dark blood. The pia of the convexity little thickened, stretched, in general injected, the pial veins, especially the left side, clearly full. Brain weighs 1080 g.

The substance of the brain is of a hard friable consistence, and of a strikingly moist appearance. Cortex is hypertro-

phic dark greyish violet colored. Venticles anteriorly a little wider; in the middle and posteriorly narrow. Fluid dark blood in the basal sinus.

Subcutaneous tissue rich in fat. Musculature thick and very dark. Dark fluid blood in the jugular.

Both lungs fixed, rather dilated. Remnants of the thymus as a bilobular loosely granular hyperemic organ, reaching to the base of the pericardium. A little clear fluid in the pericardium. Heart oblique, correspondingly large, on the apex a superficial milk spot. In the right cavities, fibrin; left, fibrin and clotted blood. Musculature of left heart a little thicker. The musculature of both sides is cross-striated streaked with light and dark, homogeneous on section, the valves very delicate and correctly formed.

Left lung small, rather heavy, everywhere containing air clearly rich in blood, and moderately edemic. In the middle of the posterior part of the lower lobe it is harder, friable, homogeneously granulated on section, dark reddish brown color, and containing fluid. Similar fluid found in bronchi. Mucous membrane intensely dark colored. Right lung, somewhat smaller, lighter, contains air, moderately edemic, tenacious mucous in the bronchi, mucous membrane of the pharynx dark colored, that of the esophagus stained with bile. Larynx and trachea pale. Thyroid gland rather large, aorta thin-walled, measuring 3.9 cm. in circumference above the diaphragm.

Position of abdominal contents correct, peritoneum rather rich in fat, spleen somewhat larger, hard, friable, dark-brown color, pulp large amount.

Left suprarenal normal; left kidney rather large, capsule delicate, easily detachable, surface smooth. Right kidney somewhat paler, otherwise like the left. Suprarenal capsule like the left.

The stomach contains bilestained fluid, mucous membrane normal thickness, slightly thrown into folds, bile stained. In intestinal canal, usual contents, walls medium thickness, mucous membrane here and there violet spotted. That of the small intestine, thin, smooth, homogeneously light violet colored. Pancreas of normal structure.

Liver of medium size, tissue hard, friable, dark brown color,

lightly yellow spotted. In the gall bladder, dark, blackish fluid bile.

In the urinary bladder, cloudy, pale yellow urine, mucous membrane normal. Vagina of proper length and width, mucous membrane hard, dark bluish violet in color. Uterus larger, puerperal malacious. Remnants of placenta in form of a plaque 1 cm. high attached to the anterior wall. Ovaries large and rich in follicles, without a true corpus luteum. Tubes of both sides free. Mucous membrane of the rectum very dark red.

Diagnosis. Hyperemia cerebi et meningium. Pneumonia sinistra. Uterus p. partum.

The examination of the ears made by me, showed the drums thick and of whitish color.

In the right tympanic cavity were connective tissue adhesions around the stapes, from the base to the neck, and the niche of the round window seemed to be completely occupied by connective tissue. From the middle of the promontory a splinter of bone projected downward, and another antero-inferiorly from it.

The left ear was similarly constructed, and here also were found adhesions around the stapes, and the niche of the round window occupied by connective tissue.

MICROSCOPIC FINDINGS.

RIGHT EAR.—On the floor of the internal meatus, profuse hemorrhage between the nerve fibres. In the acousticus, some small foci of altered nerve fibres. They are deeply and diffusely stained, their contour indistinct or not at all distinguishable, no corpora amylacea. As all reaction signs are absent, it is probably a case of post mortem change.

The soft parts of the cochlea in the upper turns have suffered somewhat through decomposition, while the lower are well retained. There are no pathologic changes.

The upper part of the posterior semicircular canal and the external portion of the external show the bony wall irregularly excavated.

Of the middle ear, the cartilaginous part of the Eustachian tube, whose lowest part is wanting in the specimen, shows a

lining consisting of fibrous connective tissue between whose upper layers a few long-oval and spindle shaped nuclei are found, while glands are entirely absent. The lining of the bony tube shows a similar construction.

The mucous membrane in the middle ear is very different in appearance at different places. While at places on the promontory it is so thin that, between epithelium and bone, a submucous and periosteal layer can no longer be found; at the superior part of the internal wall it is of almost normal appearance, and at the inferior part of the internal wall it is rather swollen, inflammatorily infiltrated, its vessels greatly dilated, the epithelium well retained, and a mass lies above an inflamed place on the surface, which consists near the surface of parallel, somewhat higher of a reticulated mass of fibrin threads infiltrated with pus cells.

The mucous membrane of the drum and ossicles is rather thickened and sclerotic especially near the border. Of the two large ossicles, the hammer is very sclerotic, as is the anterior part and the long process of the anvil, and the vessel channels show very dilated and filled vessels and an irregularly excavated surface.

In the niches is a similar fibrinous inflammation of the mucous membrane and a rich fibrino-purulent exudate lies on the mucous membrane, especially in the niche of the round window and the underlying, adjacent, excavated and cellular spaces of the bone. In addition, the niche of the round window is closed off by a broad connective tissue membrane from the middle ear, in its external portion. In the niche of the oval window are likewise thin, firm connective tissue adhesions between the bars of the stapes and the inferior wall of the niche, the promontory, and the facial canal above the niche. The stapes itself shows on its base anteriorly and externally, a medium-sized hyperostosis.

The mucous membrane of the aditus and mastoid process is not observably altered, yet some of the neighboring cellular spaces of the bone are filled with connective tissue, and bordered on their inner walls by small layers of osteoblasts and a red-stained area of bone. The bone of the pars petrosa shows a medium-sized hyperostosis, corresponding to the inner wall of the middle ear which extends posteriorly to

the windows, and is plainly demonstrated by its staining more deeply with hematoxylin. Fresher inflammatory changes are found in the pneumatic cells bordering on the middle ear, as well above as below the actual labyrinthal capsule. Their mucous lining is altered exactly like that in the adjacent part of the middle ear, and in the lower cells is the same fibrino-purulent deposit.

Some smaller cellular spaces show no lumen at all, but are filled out with fresh connective tissue with dilated vessels while osteoblasts are found on their bony wall. Beneath the diseased mucous membrane, the vessel channels in the bone are widened, as are the enclosed vessels, near to which are numerous developmental cells. The surrounding area shows likewise osteoblasts and new-formed area of bone staining very deeply with eosin.

A large lesion in the bone is found only in the external wall of the niche of the round window. The bone here, as a result of the fibrinous inflammation of the mucous membrane, although separated from it by the thickened periostum, is diseased along the entire wall, and the disease reaches beyond the region of the round window within the bone, further back toward the mastoid. The diseased bone is differentiated both by its structure and by different reaction toward the stains employed from the healthy. It does not, however, show the same appearance everywhere. In its most anterior part, are moderately dilated vessel channels, with few cellular contents, surrounded by a very calcareous bone, staining deeply a dark blue with hematoxylin-eosin, while in the posterior, larger portion, the lesion shows more reddish blue color. The bone here is everywhere traversed by very wide vessel channels in which are dilated vessels and numerous large cells. The cells of the bone show here a rounder form, indistinct nuclei, and a clearer zone surrounding them. It is an osteoid tissue that has already commenced to calcify.

The numerous spaces, containing medullary substance, in the spongy bone above the cochlea and the vestibule, are, like those lying further inward, completely free from any pathologic change.

On the posterior wall of the tympanic cavity, but even

more on the external and superior wall of the attic, great changes are visible in the bone. Especially in the anterior part of the attic, the cells adjoining the middle ear are entirely filled with dense fibrous connective tissue, and are separated from one another only by small plates of bone. These also consist for the most part only of osteoid tissue, that is lined at the periphery with layers of osteoblasts. In the superior layers, lying next to the dura, the bone seems only a little more altered, and only in a few cells are there dilated vessels, osteoid tissue and a rich cellular content. Scanty changes in the bone are found in the Glaserian fissure, in the bone of the tuba Eustachii, or in the mastoid process, although the bone in the region of the semicircular canals shows a sclerotic structure, and the lumen of the canals is very irregular, on account of excavations and small bony prominencies on the inner surface, i. e., shows changes of older nature. In the posterior part of the mastoid, in the bony walls of the cellular space, there is found a severe hyperemia with dilatation of the vessel channels, and osteoid areas with osteoblasts on the bony wall.

LEFT EAR.—In the internal meatus, the degenerated nerve bundles are less numerous and smaller than the right, but the hemorrhages are as profuse. The parts of the cochlea are well retained and show no variation; the vestibule and canals are similar to the right side.

MIDDLE EAR.—The lining of the cartilaginous tube is similar to the right; that of the bony tube is richer in cells and the vessels are over-filled with blood. Broad strands of connective tissue pass from the lining into the adjoining bony spaces, which also are partially filled with connective tissue and surrounded by pathologically altered bone. The internal layer of the drum is thickened and consists of sclerotic connective tissue, the mucous membrane covering both large ossicles is in places moderately inflammatorily infiltrated and adjoining these diseased portions of the mucous membrane are large spaces in the hammer which are filled with proliferated connective tissue and dilated vessels, and are bordered by new-formed osteoid areas and osteoblasts. The short process in places shows calcification of its cartilaginous layer. The anvil is not pathologic except for a

hyperemia of its bone vessels. In the middle ear, as in the right is found in places fibrinous inflammation of the mucous membrane, and this is especially plain in the region of the niches and on the floor of the tympanic cavity. The swelling and infiltration of the mucous membrane have not attained a very high degree, yet beneath the fibrinous exudate, especially in the niches, are band-like adhesions, which contain numerous spindle cells, as do the deeper layers of the inflamed mucous membrane. The same fibrinous inflammation is found in the spaces under the vestibule and cochlea which border on the middle ear, and which are lined with mucous membrane, while some of the smaller of these cells are filled out with a connective tissue rich in spindle cells. Cells filled only with mucus are also found. The sinus tympani is entirely filled with connective tissue, and its walls show a fresh hyperostosis of bone, which is found anteriorly only partially, but posteriorly in the whole periphery of the sinus; fresh areas of osteoid substance and layers of osteoblasts are also present.

The mucous membrane in the aditus and antrum is somewhat thickened, and some cells of the mastoid are partially filled with connective tissue.

The bone of the left ear shows, in general, the same pathologic changes as the right, yet there is a difference, since the left shows no changes on the external wall of the round window, but instead a larger otitic lesion in the anterior border of the oval window's niche. This extends between the periosteum of the middle ear and the endosteum of the sacculus rotundus, i. e., affecting the entire bone from within outward, anteriorly where it soon stops, at the plane of the passage of the facial canal through the bone. Posteriorly, it projects in the bone of the upper periphery of the niche of the round window only to the broadening out of the nerve of the utriculus, becomes smaller and smaller, extends more to the surface of the posterior superior periphery of the round window's niche, where it forms a small exostosis, and ends before the posterior margin of the oval window's niche. Histologically, this focus consists almost throughout of osteoid tissue, in which, centrally, in places, are remnants of old bone, and this is traversed by wider and narrower canals.

The former contain wide vessels, a delicate fibrillary network and large cells, resembling developmental cells; in places also long spindle shaped cells, and some round cells. At the border these canals contain loose osteoid areas of bone, and layers of osteoblasts, but at places are large multinuclear osteoclasts, especially at the borders of the healthy bone.

If we review the pathologic changes of the two temporal bones, we find an acute otitis media fibrinosa of mild degree accompanied by signs of a preceeding inflammation, such as the thickening of the mucous membrane by fibrous connective tissue in the middle ear as well as the adjacent cellular spaces, several of which are entirely filled out with fibrous connective tissue. The bone was changed in different ways.

At the necropsy, an extensive hyperostosis of the cranial bone, which reached a thickness of 12 mm. in the frontal bone, was found, and the bone of the pars petrosa, especially in the neighborhood of the semicircular canals showed a more sclerotic character. There were also acute inflammatory changes, partly in the ostitic foci in the niches, partly as a more superficial lesion in the external part of the attic. Furthermore, there was a periosteal hyperostosis on the internal wall and a sclerosis of the bone beneath the round window in the left ear.

While the first-mentioned changes of the bone and the hyperostosis of the cranium are of older character, the latter, which were especially prominent in the middle ear and the bone, are only weeks or months old, and are referable to an acute inflammatory process that probably appeared during pregnancy. I must leave it undetermined, however, whether all these changes refer their origin to the same cause.

REVIEW.

In the investigations reported, I examined 12 temporal bones of 7 patients, in all of which the same bone disease was found. In 5 patients, the process was found the same on both sides, in 2 I obtained only 1 temporal bone for examination, and therefore can give no report about the other

ear. 3 of the patients were males, 4 females. Their ages, at the time of death were 27, 28, 34, 58, 61, 63 and 76 years. The time of the disease, especially in the older patients, was much earlier and as much as this could be determined from the history, which just on this point was not always trustworthy, it seems that the disease appeared in all between 20 and 40, at the most 50, years of age. These results agree completely with those of E. Hardtmann,* according to which, in 22 cases collected from the literature, the disease began in the period between 20 and 50. The most began before this, in 8 between 30 and 40, and in 5 between 20 and 30, and if I add to them the 7 cases examined by me, I can say that of 29 cases, the disease began in 9 between 20 and 30, while in my three other cases, the process began before or after the 40th year. As the exact determination of the beginning is impossible at this age, and we can experimentally assume correctly a longer rather than a shorter duration, we will not err in the assumption that, in most cases, the time of the disease falls in the 20-40 years. Of the later cases, one of Siebenmann,† was 64 years old, and had taken sick many years before, and of two new cases of Scheibe,‡ one was 27 years old, and the other was a deaf mute 8 1-2 years of age. Therefore only the last case, of which I will speak later, shows a deviation from the above rule.

Characteristic of the disease is the appearance of peculiar, sharply circumscribed foci which are present in the bone either singly, or, usually, in the number of 2 or 3, seldom more, in greater or less extent.

Their origin can be traced especially in very acute cases, in which they are present in fewer numbers; thus I found in cases IV and V, as well as in right and left ear of case VII, and in left ear of case I, only 1 focus in each bone, which had its location 4 times in the anterior periphery of the niche of the oval window, and 1 in the external periphery of the niche of the round window. Two such foci in each bone were found in the right ear of case I, 3 in both ears of cases II and III, although here, there was, in addi-

*Zeitschrift f. Ohrenheilk. Bd. XXXIII, S. 103.

†Zeitschrift f. Ohrenheilk. Bd. XXXVI, S. 291.

‡Transaction of German Otological Society, 1901, S. 175.

on] to the foci in the niches, a third at the anterior periphery of the internal meatus and the cochlea; while in case VI, in which the disease in the ear reached the greatest extent, as many as 5 and 6 ostitic lesions were demonstrable. In this case, the foci fused often, but by exact examination, especially by comparing the course of the bone disease with the other cases, it was still possible to demonstrate the same focal extension. A case of similar degree was reported by Siebenmann*, in which he was able to demonstrate 6 foci in each bone, which were almost all isolated from one another.

The disease in the bone, as in all cases in the literature, appeared always at the same places, and from these spread in certain directions in the bone. As I showed at the otologic meeting in Breslau,† it seemed to me that the bone disease began where larger or smaller vessels enter the bone from the periosteum, and that it extends later along these vessels. I came to this belief not only on account of examination of cases, in which the process had a very circumscribed position, but I convinced myself by injecting specimens of the temporal bone.

On the surface of the bone, the process usually attained only smaller extent, in that the periosteum showed localized thickening, and the vessel channels leading into the bone were widened. Only exceptionally, always in the foci in the internal meatus and in case II and III, also in the oval window's niche, was the surface of the bone ulcerated, uneven, with jagged processes, and in the internal meatus covered with scant fibrous tissue, while the ulcerated places in the middle ear were filled out with a thick fibrous connective tissue. In contrast to the mild changes on the surface, stand, usually, the great amplitude of the lesion in the depths of the bone, which in several cases affected the whole bone between the endosteum of the vestibule and cochlea on the one hand, and the periosteum of the middle ear on the other, where the process was not very extensive. I sometimes observed a tongue-like advance in the external cochlea wall, forward. I found the oldest changes in the bone

*Zeitschrift f. Ohrenheilk. Bd. XXXIV. S. 356.

†Transaction of the German Otological Society, 1901, S. 182.

usually at the point of origin of the focus, that is at the anterior border of the oval and the external border of the round window's niche, while the latest changes were usually at the internal periphery of the focus, i. e., near the endosteum of the labyrinth or at its anterior or posterior periphery. Thus it could be especially shown, in the focus in the niche of the oval window, that this usually extended forward, and only later posteriorly to attack the oval window's niche. It usually reached further posteriorly with its upper than with its lower periphery. The annular ligament, the base of the stapes and the membrane of the round window became involved secondarily in the diseases by its passing over from the labyrinth's capsule.

An exception was found in case II, in so far that there were fresh changes in the bone immediately under the periosteum of both the round and oval window niches, and this can be explained only by the fact that there was a new disease of the same part of the bone, a relapse if we will not concede that the disease in this case began further forward on the promontory, which can be proven only by further examinations.

The arrangement as well as the extent of the individual ostitic lesions, showed a certain agreement on both sides, which can be explained only by assuming that the disease penetrated into the bone and increased by way of the vessels. The disease usually affected only the capsule of the labyrinth; the real membranous labyrinth was almost never involved: only the endosteum was somewhat thickened or calcified if the process reached so far. Only once, in a very severe case, was the external superior periphery of the ligamentum spinale greatly thickened; and, a few times, the bony surrounding of the spinal ganglia and the lamina spiralis of the basal turn were extremely calcified, and only in case VI were the dividing walls of the cochlear turns involved in the otitis. I often observed that the diseased bone projected in the form of an exostosis in the labyrinthal space; in case II were exostoses bilaterally on the anterior superior periphery of the stapes; in case III there was an exostosis at the oval window and a large exostosis at the left round window, projecting into the scala tympani. In case

VI, was a stenosis of the cochlear cavity in the apex and base, as well as the lumen of some of the semicircular canals by hyperostotic diseased bone. As the bone of the internal wall in this case showed an increase in size *in toto*, the lumen of the middle ear was thereby decreased. As an exception, in case II, there was in the end portion of the scala tympani new formed endosteal bone, which was attenuated by the ostitic process in the cochlear capsule. If this finding in the bone arose on the base of the same process as the ostitis in the cochlear capsule, it must have happened in the beginning of the disease, which perhaps at that time was more severe.

The histologic changes shown by the diseased bone were very different at different places, and often all stages of the ostitis were to be found near one another. In general we must distinguish the acute and the old changes. The former are found only in cases IV and VII, but the old changes were present in all cases. The fresh changes, as Katz* has already stated, resemble greatly the picture of ostitis vasculosa of Volkmann. The hard bone of the pyramid was traversed by new-formed vessel channels which are formed by the old bones being melted away by the new vessels growing into them. How this happens, unfortunately cannot be determined with complete certainty in the comparatively thick sections of bone. In the small spaces, caused by disease process there was usually found only a dilated capillary with large endothelium, around which were some fibrillae and large developmental cells, sporadically some leucocytes and often lymphocytes. At the border of these spaces, the bone had a different aspect; very seldom were large multinuclear osteoclasts and lacuna formation found, as Siebenmann† has also stated. There were present, isolated, in some cases in larger and in others in smaller numbers, so for the dissolving of the healthy bone, other factors must be taken into consideration. The dissolving of bone by ingrowing capillaries was lately brought forward by J. Schaffer,‡ and the possi-

*These Archives Bd. LIII, S. 68

†Zeitschrift. f. Ohrenheilk. Bd. XXXIV.

‡Köl liker; Tissue Lore Bd. III, S. 673.

bility shown of osteoclasts developing directly from the cells of the capillary walls; it is probable that a similar process was present in the bone resorption in the cases described. I often saw also, as noted above, some cells of the otherwise healthy bone, at the border of the lesions, that had increased in size and had formed a small court around themselves, and, between these cells, a small canal had appeared as the first sign of the disease,

This process of vascularization of the bone has been described by Rindfleisch as canaliculation, and, as I will mention here, has been observed by Soloweitschik* in syphilitic ostitis of the cranial bone. It seems that the bone corpuscles do not play the passive role so often ascribed to them, but, as my specimens show, take an active part in the process. A new work by Kurpjuweit† also makes this seem probable.

With the formation of the vessels traversing the bone, the resorption process is usually ended, and then comes the new formation of bone and the retrogression of the vessel channels. The size of these channels, at times great cavities, depends on intensity of the cause at the bottom of the disease whereby the breaking down of the bone is sometimes very limited and sometimes extensive. The new formation of the bone comes about through osteoblasts which often lie in rows along the individual borders of the bone, but often are irregular, so that, as a result, the position of the bone cells in the new formed bones is a very irregular one. I advanced, above, the assumption that in exceptional cases the old bone cells play a role, since their increase in size and the partial absorption of the bone in their neighborhood is immediately followed by additions and deposit of calcium salts. By the new formation of bone, either the existing canals and spaces are caused to disappear, and thus a completely sclerotic bone is formed, or, as is usually the case, the spaces in the bone continue to exist, and their contents are changed into a scant medullary substance; or they disappear with the exception of a small amount of connective tissue at the borders, so that the spaces are almost empty. The bone in its neighborhood, which at first had an even more osteoid character,

*Virchow's Archiv., Bd. XLVIII.

†Virchow's Archiv., Bd. 163. S. 287.

stains deeper with eosin, becomes more and more calcareous, and is distinguished more plainly from normal bone. Its cells are usually larger, irregularly arranged, and usually no clear lamellar structure is demonstrable.

CAUSE.—The most important point in this disease of the bone is the cause to which its origin is referable, and in regard to that, the opinions of the authors are still diverse, and theories are advanced based partially on clinical and partially on pathologico-anatomic findings. Katz,* when he reported his first observation, thought of a rheumatic disease of the stapes—vestibule articulation, while, I† at my first observation, because I found a cicatrix of the drum also, assumed a sequel of an otitis media, which when it appears in the course of an acute severe infectious disease, e. g., typhus, runs a very severe course and easily passes over into the bone. After the examination of 4 other temporal bones of two cases, I‡ described, in the pathologic anatomy in Schwartz's Handbook, this disease of the bone as the cause of the bony ankylosis of the stapes, and claimed that the bony ankyloses of the stapes described by Toynbee, Voltolini, Schwartz, Moos, and Tröltzsch were caused by the same bone disease. There I said, also, that I had observed the same changes in the bone after purulent otitis media.

Politzer,§ who examined his specimen of ankylosis of the stapes histologically with this in view, and found the same disease of the bone, in spite of the large number of case examined by him, could not decide on a specific cause, and spoke of hereditary predisposition, puerperium, syphilis and gout, and in the latest edition of his text book, of ozena, also, as causes. He also accepted the view of Walb that the development of this disease is favored by anemia, mental affections and nervousness. In children up to 15 years, it is to be referred to heredity, rickets and scrofulosis.

*Deutsche, Med., Wochenschr., 1890, No. 40.

†Zetschrift, f. Heilk., 1891, Bd. XII S. 381.

‡Schwartz's Handbook, 1892, Bd. I. S. 248, & 258.

§Politzer, Zeitschr. f. Ohrenheilk. Bd XXV. S. 309, Lehrbuch, IV. Aulf, S. 263, and Beleuchtungsbilder der Trommelfells, 1896, S. 79.

Gradenigo,* considered this disease as a late manifestation of hereditary syphilis, and classes them, in the sense of Fournier, with the parasyphilitic affections. Siebenmann,† takes a peculiar standpoint. According to him, the process, which he calls a spongifying of the labyrinth capsule, arises from the zone between the primary endochondral labyrinth capsule and the secondary bone formed from the connective tissue of the periosteum.

Therefore, he will not designate this spongification as a simple otitis, but considers it rather as the last phase in a development which is not normal in the pars petrosa, but which is the rule in other bones, though in another form and at another time.

The foundations for this supposition of Siebenmann must be read in his article, and I do not consider them correct, but think that Siebenmann came to this conclusion only because in his first cases the process was very wide spread. Bezold,‡ and Scheibe,§ who in 1893 and later reported such cases, say, only, that the disease arises from the periosteum of the middle ear. Schwabach,|| in his work on the "Diseases of the ear in leukemia," described a case (XIII) in which, in addition to the changes caused by the leukemia, he found an ostitic lesion in the cochlear capsule, concerning which he could not decide whether it was referable or not to the syphilis with which the patient was affected. Finally Katz,¶ has lately published a case, and in it has gone the deepest into the etiology of this disease. He assigns to the middle ear process, so often present, only a contributory value, and regards it only as an accidental antecedent, just as I did in my first case, and as I must even now agree with Katz. The chief factor in the origin of the bony disease, he

*Archiv., ital. di otologia. Bd. II S. 478.

†Zeitschr. f. Ohrenheilk, Bd. XXXIV. S. 356, XIII. internat. Congress in Paris, 1900.

‡Zeitschr. f. Ohrenheilk. Bd. XXIV. and XXVI.

§Transaction of the Otological Society, 1901, page 175.

||Zeitschr. f. Ohrenheilk. Bd. XXXI. S. 122. u. 145.

¶These archives. Bd. LII. S. 75.

Zeitschr. f. Heilkunde. Bd XII. 1891, S. 381.

ascribes to constitutional or dyscrasic diseases of the body, among which he includes especially, (1) the rheumatico-gouty, (2) the scrofulous, (3) the syphilitic, (4) unnamed senile changes, (5) the neuromyotrophic and trophoneuritic conditions. The latter and the rheumatico-gouty condition he considers the most important.

Through the examination of other cases of sclerosis, especially through the comparison of the finding in sclerosis with those in acute and chronic otitis media purulenta, I have more and more come to the conclusion that the bone diseases described is an entirely specific form of disease, whose cause I regard as syphilis. As the reasons for this supposition, I will advance the following: (1) In two of the cases examined histologically, viz., the case of Schwabach* and my No. IV, † syphilis was clearly present, as it was in two similar cases, examined only macroscopically, viz., one of Voltolini‡ and one of Downie,§ while in a case of Schwartzell, syphilis was very probably the cause. Therefore, lues was certainly the cause in 4 of the 30 cases, and almost certainly in 1. Even in the other cases, lues, although not proven, cannot be excluded with certainty. Thus in my case II, the affection began while the patient was in the army at which time syphilis is not rare; in my case VII the patient was a servant in a small inn in a street with a bad name; in case III, the patient was a single servant girl, with a daughter; and only case IV was a woman who had several children. Unfortunately in this case, the husband evaded every question about the ear affection of his wife, therefore in this case and cases I and V, I could obtain no information.

(2) A second reason, that speaks for syphilis, is the frequent beginning of the disease between the 20 to 40 to 50 year period: i. e., in a period in which syphilis is most frequently acquired, while other diseases are rare just in this

*Zeitschr f. Ohrenheilk. Bd. XXXI, S. 122.

†Transaction of the Otological Society. 1898.

‡Virchow's Archives Bd. XXVII, S. 163.

§Zeitschr f. Ohrenheilk, Bd. XXX.

These Archives Bd. IV, S. 254.

period. The cases of Bezold, where the diseases began at 17 years, and of Scheibe, at eight and one-half, do not speak against syphilis, which in Bezold's case could have been acquired early, and in Scheibe's could have been inherited.

3. The histologic findings in the diseased bone also speak for syphilis. I found in my specimens a chronic osteitis which usually advanced from the periosteum to the bone via the vessels, and spread under the surface; which showed a complete chronic course, and can last 30 years and more; in which there are probably relapses of acute inflammation; in which suppuration and necrosis are absent or only exceptionally present; where no bacteria have so far been demonstrated in the diseased tissue as a cause; i. e., everywhere changes such as are observed in syphilis of the bone. The appearance of several foci in the bone is observed in syphilis. Chiari* found numerous foci in the long bones, and it is not unusual to find the simultaneous appearance of several lesions in the cranial bones. If all authors have heretofore ascribed to the temporal bone a certain immunity against syphilis (M. B. Schmidt †), this rests simply on the fact that these lesions have rarely been accessible to clinic examination and practically never to pathologico-anatomic. The rarity of syphilis affecting it is explainable by the fact that that external irritation is almost lacking, which often causes syphilitic diseases. Often an inflammation of the middle ear can give the impetus required for syphilis to awake here, and I can in this sense agree with the above opinion of Katz‡ that the middle ear process so often present has only the value of an exciting factor. The finer histologic processes, described above, are similarly often observed in syphilis. Thus Soloweitschik, states that the osteoclasts are seldom present in syphilis of the cranial bones, and that the canalization of Rindfleisch and the vascularization of Volkmann are the chief causes of the bone absorption. He also observed the increase in size of the bone corpuscles, and that they take an active part in the disease. Although these

*Vierteljahrssch. f. Dermatol. u. Syphilis.

†Ergebnisse der Allgem. Pathol. u. pathol. Anatomie VII S. 248.

‡These Archives Bd. LIII, S. 75.

changes are not characteristic of syphilis, still the agreement of my findings with those of true syphilis of the cranial bone is worthy of notice. If now we consider the end stages of the process, especially in a patient in which the disease has become wide-spread, e. g., in my 6th case, the increase in thickness of the bone, the hyperostoses with the almost complete porosity of the diseased place, and spongy exostoses in case I and others, show clear analogies with bone changes seen in syphilis. We are reminded of the increase in thickness present in the long bones, and the circumscribed projections with porosity and greater fragility of the whole bony substance, so that the only difference is that these changes are found in an unusual place, namely, the petrous pyramid.

It is still necessary to mention two circumstances that speak against these bone changes being syphilitic, viz.: the lack of distinct gummatous tissue, and the rarity of any destructive process, especially caries and necrosis of the bone. That these do not speak against syphilis, I can refer to Virchow*, who states that with an attenuation of the syphilitic virus, there usually arose products which often have only the character of a hyperplasia, and mentions as an example of this kind of syphilitic changes, the hyperostoses of the bones of the extremities, which, as I mentioned above in case VI, similarly develop in the temporal bone. Volkmaïn† also says that in addition to the more specific process of gummi formation, the syphilitic bone diseases show also only the picture of simple inflammation, which is apparently indistinguishable from the non-syphilitic but has individual characteristics at the most in the locality and the total habitus of the changes brought about. Soloweitschik‡ stated in his work on syphilitic cranial affections that caries and necrosis are not to be regarded as conditions belonging to the syphilis, but only as the possible sequel of the perostitis and ostitis gummosa under especially unfavorable and accidental conditions. That other destructive processes were not entirely absent in my cases is proven by the specimens of cases

*Die Krankhaften Geschwülste S. 403.

†Handbook of Pitha, and Billroth. II. 2. Abt. S. 268.

‡Virchow's Archiv. Bd. XLVIII. S. 195.

I, III, II, and VI, in which are found defects in the internal meatus, and those of cases I and II, in which were found similar defects of the bone in the niche of the oval window. The former especially gives the impression of being healed gummatous periostitis and ostitis. The second circumstance which speaks against this form of disease being a syphilitic one is the absence of other syphilitic lesions elsewhere in the body. If, now, we examine carefully the cases of sclerosis, reported in the literature, we do not find a complete necropsy given in the greater number of them, and even when it is given, and contains no mention of syphilis, this is really no proof that no syphilis had existed. It is precisely the osseous system alone that is most frequently affected by syphilis, while the internal organs and the skin show no lesions, and an exact examination of the bones at the necropsy is often not made. The diagnosis of previous syphilis is much more seldom made in the cadaver than it is observed in life. I would here like to mention that in some of my cases, in the post-mortem report is found the statement: Cranium thick and compact; and especially in case VII, the extreme hyperostosis of the cranium which caused a thickness of 12 mm. in the frontal bone, so that it can be supposed that this patient suffered from hereditary lues. Unfortunately, I paid too little attention at first to the presence in my specimens of a change that frequently is found in syphilis, viz.: disease of the vessels, and only later examined the sections with this in mind, and found that I could demonstrate in most of the cases endarteritic changes. I failed only in cases II and VII. In some, the changes might have been due to the age of the patient, and I will examine all new cases for these changes especially.

Of the other causes which could be assigned to the origin of this disease, acute and chronic inflammation of the middle ear must be mentioned first. Herefore I was under the impression that these under certain circumstances attack the bone in a milder form and cause these bony changes.

That, truly, disease of the bone accompanies acute and chronic middle ear inflammations, is proven by a number of pathologico-histologic investigations, in addition to numerous clinical observations. I* myself have proven that in

*These Archives. Bd. XLII. S. 128.

otitis media purulenta acuta the inflammation usually attacks the cellular spaces, pneumatic and medullary, that border on the middle ear and are in communication with them, and that accordingly as these spaces are developed differently in different people—above or below the labyrinth capsule—circumscribed inflammations and small empyemas appear in them, while the real labyrinth capsule shows only scanty changes in the larger vessel channels (sequelae of congestive hyperemias) and can be affected by the inflammation only secondarily from the middle ear itself, or the cellular spaces. At one place or another there is an erosion of the bone and a perforation into the labyrinth, and numerous examples of this kind have been lately described by Panse* and Manasse.† I myself have examined several such cases, although I have not described them fully.

Furthermore, I have described two forms of lesions of the bone that similarly are accompanied by hyperostosis of the internal wall and appear as a result of middle ear inflammation. In one‡ the hyperostosis of the promontory and the occlusion of the window arises through an ossifying periostitis; in the other § through a superficial otitis, a form of disease which, in spite of its similarity to that accompanying the so-called sclerosis, differs in its extent, duration and sequelae.

A second form of inflammation of the bone, that could be used to explain the otosclerosis, is infectious osteomyelitis. This disease likewise enters into the bone via the vessels, and under certain circumstances can cause a return of the inflammation after the lapse of a large number of years, even 29. There also exist milder forms of this disease which Kocher and Tavel|| have described as proliferating forms (ostitis vasculosa, sclerotica, granulosa, and serosa). Such more chronic forms of infectious osteomyelitis have been

*These Archives. Bd. LVIII S. 184.

†Zeitschr. f. Ohrenheilk. Bd. XLIV. S. 41.

‡These Archives. Bd. LIII. S. 52.

§Ebenda. Bd. L. S. 242.

||Vorlesungen über chirurg. Infectiouskrankheiten, I. S. 145.

described by Garré,* Kocher,† Ehrlich‡ and Jordan,§ and Albert and Kolisko,|| in a work on osteomyelitis of the cranium directly make the claim that this in the temporal bone often causes an otitis media, and runs its course under the picture of this disease. Zeroni,¶ also relates a case in which, in addition to other osteomyelitic foci in the body elsewhere, there was also one in the bone of the external meatus, without involvement of the middle ear.

A circumstance which speaks very forcibly against the identity of our otitis with a milder form of this disease, is that, as most authors state, infectious osteomyelitis is a disease of youth alone, and that at the 20th year the tendency to this disease is almost entirely gone, while in otosclerosis the first appearance of the disease is observed almost exclusively in late life, from 20 to 50 years of age. Furthermore, even in the chronic forms of infectious osteomyelitis, formation of sequestra, although not the rule, is very frequent, as the observations of the above authors show. Finally in this disease, the cause of the infection, usually the staphylococcus is found in the bone, and can remain there many years; in the cases of otosclerosis heretofore examined no bacteria could be found as the cause of the disease.

Of other causes that must be taken into consideration in determining the cause of the described bone disease, I must mention the rheumatico-gouty diathesis, on which Katz lays great emphasis. In gout, we have a deposit of uric acid salts in the joints, the matrix of the cartilages, the capsules of the joints, the tendon sheathes and ligaments, while the bone does not take part in the disease, i. e., a process entirely different from ours which attacks the bone especially. Rheumatic disease of the joints conducts itself similarly, and,

*Beiträge zur klin. Chirurgie. 1893.

†l. c. S. 141.

‡Ueber latente Eiterherde im Knochen. Münch. Med., Wochensch., 1896.

§Ueber akute Osteomyel. Beitrag zur. klin. Chirurgie. Bd. X. S. 749.

¶Untersuch über Osteomyelitis. Wien. S. 27.

*These Archives. Bd. LIII. S. 316.

at the most, we could think only of arthritis deformans. Such a disease is denied not only by the histologic findings, as I convinced myself by an example that I was able to examine, but also by the non-involvement of the other joints of the body, a large number of which are usually involved in arthritis deformans.

That the puerperium has a causal relationship to otosclerosis is especially insisted on by Politzer,* and two of my cases, Nos. IV. and VI., seem to confirm this. It is well known that changes in the bony system not infrequently follow the puerperium, and Hanau,† has lately studied these changes. Siebenmann,‡ reports that Hanau examined his specimens of otosclerosis and gave his opinion that he could find no relationship or similarity to the puerperal bony processes. As well as I was able to understand Hanau's report on puerperal bone disease, and by my own examination of two cases of this disease, I am convinced that they are two entirely different conditions. A certain correctness cannot be denied to Politzer's opinion, as I can prove by several of my own clinical observations. Frequently pregnancy is accompanied by a syphilitic infection, and we know that in just such women syphilis is often more latent, not showing clear external symptoms. Likewise a hereditary luetic can acquire an otosclerosis as a result of pregnancy, an example of which is given by case VII., if the disease in the bone had not already commenced before pregnancy.

If we compare the results of the above investigations with our clinical experiences, these also strengthen the probability of such a cause for otosclerosis. Though it must be admitted that forms of tubal and middle ear catarrh, as well as mild forms of acute middle ear inflammation can cause a similar disturbance in hearing with the characteristics of a severe interference with sound conduction, still there are plenty of cases in which syphilis can be proven to be the cause. Of 116 cases of luetic disease of the ears that I coi

*Beleuchtungsbilder der Trommelfells. 1896, S. 79.

†International Congress at Rome. Vol. II. Page 148.

‡Zeitschr. f. Ohrenheilk. Bd. XXXIV.

lected in my treatment of the luetic diseases of the ear,* I found 24, that on testing the hearing, gave the picture of an extreme interference with sound conduction, and in these I had to refer the disturbance in hearing to luetic changes on the internal wall of the middle ear and in the window niches. In the histories of patients of our clinic in the last 5 years, I lately found 20 (9 men and 11 women,) in which lues could be shown to be the cause of the sclerosis, and 25 others (7 men and 18 women) in whom nothing was said about lues, but where no other etiologic factor could be found, unless a previous purulent catarrh of the naso-pharynx. Certainly, in some cases, lues could not be excluded.

Of the first 20 cases, 7 were from 21 to 30 years old; 7, 31 to 40; 3, 41 to 50; 1, 51 to 60. A boy of 7 years showed a considerable sclerosis on the basis of hereditary lues, and one 19 years old had acquired it 2 years before. Of the other 25, 4 were between 21 and 30; 11 between 31 and 40; 9 between 40 and 50; and one 52 years old.

SYMPTOMS.—As already stated, different diseases are classed as otosclerosis, according to whether it is defined from a clinical or anatomic standpoint. Here we can treat only of the symptoms of that case which shows by pathologico-anatomic examination the above described lesions.

DIFFICULTY IN HEARING is one of the most frequent symptoms, and frequently attains a high degree in a short time, especially if the windows are greatly affected, but under certain circumstances, especially at first, can be minimal or even be absent. If, as in my case VII, only an ostitic focus is present on the lateral part of the niche of the round window. The same can be true if the focus in the oval window extends more anteriorly and does not attack the stapes and its articulation, a thing which seldom happens.

Testing in these cases will show little that is characteristic, as also in those very severe cases where there is almost complete deafness, is, e. g., my case VI. In the cases of medium degree, which comprise the majority, will be found those signs which Bezold designates as characteristic, for bony ankylosis of the stapes, viz., raising of the lower

*Haug's Sammlung klinischer Vorträge. Bd. I.

limit of the musical scale, negative Rinné and prolongation of bone conduction. While the first two signs are usually present, the last was absent in case III, and if I examine for this point the 20 cases of clinically proven luetic sclerosis, I find it noted only 3 times. Lengthening of bone conduction, by the method used by me, the small c tuning fork recommended by Lucae, is very seldom present. Where the explanation for this lies, must be shown by further examination. The value of Gellé's experiment for the diagnosis of stapes ankylosis, on which Block and his pupils* lay stress, must be mentioned here.

-A second symptom, that often is present, SUBJECTIVE NOISES, is explainable in many cases, as I have already stated† by the extension over of the disease to the round window and the neighboring nerves, the basal turn and the cochlear spiral. The changes in the internal meatus and lamina spiralis must also be taken into consideration. DIZZINESS also can be caused by the spreading of the disease from the the oval window onto the point of passage of the nerves of the semicircular canal, and this symptom as well as subjective noises can disappear after cessation of process. Diseases of the endosteum, as Siebermann state, can cause a decrease in the pressure of the labyrinthal fluid and thus symptoms of irritation, as probably happened in my case IV as a result of the closure of the aqueductus cochlearis. The appearance of the drum described by Schwartze is characteristic for ankylosis of the stapes, whose relationship to the bony disease of the promontory I showed in my pathologic anatomy, is present in those cases in which the drum has not been rendered less transparent through previous diseases. It can also be present where a hyperemia of the promontory is present as the result of a catarrhal process.

It is not difficult to make a diagnosis if the cause, syphilis, is known, but when this is not, it may be difficult to differentiate it from other processes that cause obstruction of the niches and stapes ankylosis. As such processes, that can be confused with the first form, and that lead to non-

*Stern, Immobility of the stapes, Wiesbaden 1903.

†Schwartze's Handbook, Bd. I. S. 248.

syphilitic sclerosis, can be mentioned catarrhal inflammation of the tube and middle ear, which extend from the nose into the ear, and secondly, certain forms of middle ear inflammations which run their course without severe subjective symptoms and without perforation of the drum, and can lead, in a short time to severe impairment of audition by organization of the exudate in the niches of the windows. The diagnosis of these forms from the luetic sclerosis is made by an exact history of the patient, and especially by the fact that in the catarrhal forms, exacerbations may often appear from external factors, catarrh of the nose, etc., and amelioration is accomplished by the catheter and treatment of the catarrh.

The diagnosis of luetic sclerosis as a syphilitic periosteogenetic otitis and osteomyelitis from the other forms of syphilitic disease of the labyrinth can, under certain circumstances, be very difficult if not impossible. This is especially true for the endosteogenetic syphilis of the labyrinth, the endosteal labyrinth syphilis that causes a filling of the inner space of the labyrinth with connective tissue (Manasse)* or even bone (Downie),† probably case III of mine. The diagnosis of nerve syphilis, which is more frequent, is much easier and Manasse and Politzer‡ have made histologic examinations thereof.

The treatment of luetic sclerosis can be only antiluetic, although I must admit that we often start too late. That we can expect from it something under favorable circumstances, is vouched for by the fact that the iodides have for a long time been in favor in the chronic forms of progressive deafness. Against the fixation of the sound conducting apparatus, we can use the mechanical treatment from the external auditory meatus, which has the purpose of restoring mobility. Some of my experiences have taught me that some good, moderate though it be, can be so accomplished.

*Zeitschr. f. Ohrenheilk. Bd. XXXIX S. I.

†Ebenda. Bd. XXX.

‡Lehrbuch der Ohrenheilkunde.

L.

OTITIC SEROUS MENINGITIS. LUMBAR PUNCTURE
—RECOVERY.

FRANCIS H. HUBER, M. D.

NEW YORK.

Ida B., two and a half years old, born in New York, of Russian parentage, was admitted to the children's ward, Beth Israel Hospital, January 8, 1903. No history of tuberculosis in the family. History of insanity in grandmother, uncle died insane, aunt suffers from epilepsy. Father alcoholic.

PERSONAL HISTORY:—Was born after difficult labor, though instruments were not employed, cyanosed for several days, cry feeble. Breast-fed for nine months, began to walk at 17 months. For more than two years has had a foul smelling discharge from the right ear, the original cause of which could not be made out at the time. No history of any eruptive fevers. A subsequent examination revealed large adenoids.

PRESENT HISTORY:—Fourteen days before admission, the child became restless, began to cry a great deal and acted as though greatly frightened. Four days later began to have convulsions. The seizures were general and occurred every thirty minutes. The attacks were characterized by a loud cry, the child would fall to the ground suddenly. The movements were both clonic and tonic and lasted about three minutes. Of late, the attacks have increased in frequency, but are of shorter duration. Occasionally vomiting occurred after an attack, at other times the child would cry and fall asleep.

The convulsive attacks occur at night as well as during the day and are brought on by any external source of irritation. On admission: General nutrition good. Face suffused, expression dull, child apathetic and in a semi-comatose state. Extremities cold and blue. Surface generally mottled. Tongue coated, moist. Eyes convergent strabismus, moderate

lateral nystagmus. Pupils dilated, right more so than left. Under light test contract slowly and to moderate extent. Then slowly dilate again, and again contract. Tache cerebrale easily produced. An offensive purulent discharge from the right ear, no tenderness over the mastoid region or side of skull. No edema of this area. Pulse rapid, no irregularity or intermission. Reflexes in general exaggerated. Moving the patient or attempts at feeding were followed by convulsive seizures. Lumbar puncture proposed for diagnostic purposes, could not be carried out as the violent character of the attacks brought on in attempting to put the child in position, interfered with the necessary manipulations.

The neuropathic family history of insanity, epilepsy, etc., in the parents and near relatives suggested a condition of status epilepticus. The latter, however, could be excluded from the history of the case, and the fact that the convulsions dated back only two weeks. Careful inquiry failed to elicit a history of a fall, blow or traumatism of any kind. By exclusion therefore we were compelled to look upon the chronic suppuration in the ear as a probable etiological factor, though no focal symptoms were present. The statistics of Pitt estimate that 5 per cent. of all cases of meningitis are of otitic origin. Dr. W. Freudenthal, to whom I herewith extend my thanks for his wise and conservative counsel, was requested to examine the patient.

REPORT OF DR. WOLF FREUDENTHAL.

"On January 10th, 1903, I saw the above mentioned child at the request of Dr. Francis Huber. She had had convulsions, which were increasing in number and severity, the pulse was getting irregular and the whole aspect of the case appeared worse than at the beginning. There being a suspicion of mastoiditis I was called in. After removing from the right ear the offensive discharge that had lasted for the past two years, an exceptionally large perforation of the drum membrane could be seen, out of which pus oozed. There was no swelling over the mastoid, no tenderness or pain over any part, the temperature was 100, pulse 130 and the child cried incessantly. Besides it had had seven attacks during the past night and eight during the day. As the mastoid

symptoms were not very well marked, it was thought there could be no risk in waiting 24 hours longer. At the end of this period the attacks had increased in frequency and the general prostration was more marked. The general belief of all concerned in the case now was, that the only salvation for the child could come from the opening of the mastoid. At 2:30 P. M., on January 11th, the operation was performed in the usual manner. After chiseling away all the diseased bone, the dura mater was seen to bulge outward and it was apparent that there was pressure from within. I hesitated however, to withdraw any fluid, because an infection was possible and surely not desirable. The wound was packed and at 4 P. M. the house physician, Dr. Nisonoff under the supervision of Dr. Huber withdrew about 30.0 grammes of spinal fluid by means of lumbar puncture. Within the next two hours the child had three convulsive attacks. Six hours later twitching of the extremities set in beginning at 12 midnight and ending at 1 A. M. She became quiet after repeated hypnotic medication. Another such severe attack commenced at 4:45 in the morning and lasted three-quarters of an hour. At noon the next day (12th) 10.0 grammes of spinal fluid were withdrawn, after which the symptoms slowly but gradually improved and the child was discharged on February 2, 1903, i.e., 22 days after the operation was performed."

When seen subsequently about two months later she was bright and active, running and playing, presenting no evidence of her severe illness.

In the treatment of the case there is no doubt in my mind that in spite of the non-existence of any local evidence of mastoid trouble, the operation was justified. In addition to getting rid of the local diseased focus we were enabled to eliminate a possible pachymeningitis and at the same time relieve the pressure to a limited extent. In resorting to lumbar puncture an accidental infection, immediate or secondary, of the cerebral meninges was avoided. The favorable therapeutic effects following the withdrawal of the cerebro spinal fluid were manifested in a very few days. On the 14th the child was still somewhat restless. On the 16th it was bright, took interest in its surroundings and could with difficulty be kept in bed.

209 E. 17th Street.

LI.

PRIMARY EPITHELIOMA OF THE NASAL FOSSAE, WITH REPORT OF CASE.

S. INGERMAN, M. D.,

NEW YORK.

The malignant growths in generl do not occur very often in the nasal fossae, but of all, carcinoma is the least frequent.

Until recently but a few cases have been recorded in the medical press. For 1892 Dr. Dreyfus,* after a thorough research and study of the subject, reported only 13 cases in his very instructive treatise, "The Malignant Epithelial Growths of the Nasal Fossae."

According to his investigations the first case was reported by Robin in 1852, "Hypertrophie Glandulaire." Some other authors believe there were cases reported at an earlier date; we find for instance in the statistics of Prof. Gibb,† a case reported by Earle as far back as 1827. Nevertheless I consider the claim of Dreyfus to be more correct and reliable, because he considers only cases the diagnosis of which have been confirmed by a microscopic examination. In the last ten years we find single cases of primary carcinoma of the nose more frequently reported, but the total number of all reported cases is small enough to demonstrate that primary carcinomatous affection of the nasal fossae is of very uncommon occurrence.

In the year 1900 Prof. Kuemmel‡ found in the literature not more than 40 cases. Two years later Prof. Gibb in the

*Dr. Dreyfus. Wiener Med. Presse, 1892.

†Dr. J. S. Gibb, "Malignant Dis. of the Nose," N. Y. State J. of Med., page 56, 1902.

‡Kuemmel: "Die bosartigen Geschwulste des Nase."—Handbuch der Laryng. und Rhinolog.—Heymann, Vol. III, 1900.

above quoted treatise reported 78 cases, but if we consider those cases only which were confirmed by microscopic examination, this number would necessarily be considerably reduced. In my opinion, the total of all cases, including the ones reported last year,* is between 60 and 70.

The question as how the primary carcinoma of the nasal fossae originates is as yet but little understood. Whether the benign tumors may become malignant is an open question upon which most authors differ; some believe for instance that polypi can change under certain conditions into carcinoma. As a proof of the assertion they point out the fact that in some cases of carcinoma of the nasal fossae polypi have also been found.

Prof. Kuemmel, FINDER† and others believe that the coexistence of these two growths does not prove that one growth changes into the other; they may develop entirely independent of each other. If any such transformation takes place at all, it is more likely to occur in regard to papilloma and adenoma.

But of all cases of primary carcinoma of the nasal fossae which have been reported, there is to my knowledge only one case where a change from a benign into a malignant tumor has been more or less proven—this is a case of adenocarcinoma reported by Dr. Cordes,‡ which changed from a pure adenoma.

In regard to this kind of tumor, Prof. Kuemmel says: "The distinction between this kind of adenoma and carcinoma is hardly to be noticed; being of the same histological structure some of them may conserve their benign character, while the others may turn earlier or later into a distinctly malignant tumor."

*S. Citelli and N. Calamida, Beiträge, zur Lehre von den Epithelioma der nasenschleimhaut. Arch. f. Laryng., 1902. B. XIII., Heft. 2. Wm. Darnal. "Prim. carc. of the Nasal Chambers."—Jour. Amer. Med. Assn., Chicago, 1903.

†G. FINDER: "Einige Bemerkungen ueber Malig. Nasen geschwulste."—Arch. f. Laryng., Vol. V., 1896.

‡Dr. Cordes: "Das Adenocarcinom., Berl. Kl. Wochenschrift, VIII, 1903.

As to the seat of carcinoma in the nasal fossae authors differ in their opinions. Some mention first of all the upper part of the septum, then the inferior turbinate and others the roof of the nasal fossae (Kuemmel, Finder), while others (Cordes, Citelli and Calamida and others) on the contrary, point out the mucous membrane of the ethmoidal cells as the seat of the growth.

The nature of the carcinoma does not depend on its seat. Primary carcinoma of the nasal fossae may be classified as follows:

1. Cylindrical Epithelium Carcinoma.
2. Flat-Epithelium Carcinoma (Epithelioma).
3. Adeno Carcinoma.

The frequency of these different forms occur in the same order.

It is unnecessary here to emphasize how important it is in case of carcinoma to make a positive diagnosis early, which can be attained only through a microscopic examination.

The symptoms in general do not give a complete idea of the affection. Obstruction of the nose, which depends entirely on the seat and size of the tumor (it is missing in my case), is not at all characteristic of carcinoma as such, because it is apt to occur in cases of benign tumors as well as in some other pathological conditions of the nasal fossae. More characteristic is the sero-sanguinolent secretion.

Some authors (Cordes and others) consider the hemorrhage a constant symptom of malignant tumors of the nasal fossae in general; in fact, it is very important for differential diagnosis between sarcoma and carcinoma, for in most cases it is a positive and characteristic symptom of sarcoma. In carcinoma the hemorrhage is insignificant and secondary; a result of the ulceration on the surface of the tumor.

A very important symptom, which in some cases (at least in mine) is the most prominent in the entire symptom-complex is pain, which like neuralgic pain, according to the seat of the growth, irradiates in different directions, and is at times very intense. Necrotic processes with ulceration and slight hemorrhage occur in most cases, but hardly, if at all, cause a deformity of the surrounding bones, which is the rule in cases of sarcoma.

The age of the patient is also very material for the differential diagnosis between sarcoma and carcinoma, the former finding its victims in youth, the latter occurring with very few exceptions in advanced age.

The duration of the disease is an average of 1-3 years, although there have been cases of 4 to 7 months duration reported,* and others of 11-12 years.†

One of the most characteristic features of carcinoma of the nasal fossae is the lack of metastatic processes. If at all, these cases show a very slight disposition for infiltration of the regional lymphatic glands, while in cases of sarcoma it is hardly ever missing.

The *prognosis* of carcinoma of the nasal fossae is in general a very bad one. Almost all the cases operated upon as well as those which were not have been followed by death. The only lucky exception is the case of Dr. Cordes (adeno-carcinoma).

As to the treatment there is not much to be said. According to the above quoted reports the results of radical operation are far from encouraging, still the radical operation remains the only means of treatment. In cases where an early diagnosis is made and where therefore the malignant process has not developed too far, better results may probably be achieved. In such cases a radical operation is to be considered.

The following case has been for some time under my observation.

W. F., 58 years old, family history good, in appearance strong and robust, was operated upon years ago for some rectal trouble (periproctitis). About a year and a half ago he suffered from an attack of scarlet fever from which he recovered very soon, but which evidently left some nose trouble. A short while after he noticed in the left nasal fossa a "pimple," which caused him quite an acute pain. Since that time he consulted various physicians but the pain did not yield to treatment. In the beginning of October the patient came to me.

*Douglas, Wm. Darnal and Pepper and Shakespeare, Philadelphia Medical Times, 1879.

†Newdorfer and Hopkins.

Status praesens: nothing is to be seen on the nose externally, except the frequent dropping of a sanguinolent secretion from the left naris. Free nasal breathing on both sides—no signs of any obstruction of the nose. Nasal examination shows the presence of a slight septal deviation on the left side, otherwise normal condition as far as the turbinates on the sinuses are concerned. On the lower part of the septum on the left side not far above the junction of the skin and the mucous membrane, a tumor can be seen about one-half cm. high, 1 cm. wide and 2 cm. long, of dark red color with an ulcerated surface. The appearance of the tumor as well as the peculiar pain which the tumor caused led me to believe it to be a carcinoma.

A piece of the tumor was microscopically examined and the report received reads as follows: "Sections show epithelioma with numerous pearl nests and multiple mitoses." The sections leave no doubt as to the nature of the tumor: masses of squamous epithelium of different shapes, formation of cell-nests of irregular forms, in many places the so-called epithelial pearls, which under close observation show the well known onion-like form of concentrically arranged cells.

As the tumor was absolutely circumscribed and attached to the cartilaginous part of the septum, I thought the best course of treatment would be the following: After an application of cocain and adrenalin I removed the entire growth with the scissors and snare, and then curetted the entire base of the tumor and a part of the surrounding healthy tissue. To avoid subsequent hemorrhage I applied chromic acid upon the operated surface. The wound did not take long to heal and ten days later the part of the septum which had been operated upon was as smooth and normal as the rest of the septum, and there was no pain. I have seen the patient a few times since, but could not detect any thing abnormal, or any recurrence within the nasal cavity.

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LII.

MASTOID DISEASE AND CEREBELLAR ABSCESS.

BY SEYMOUR OPPENHEIMER, M. D. •

NEW YORK.

The importance of encephalic pus collections in their relation to the diseases of the temporal bone, in which purulent inflammatory changes play an essential part, can only be estimated by the amount of destruction wrought in the brain tissue and adjacent structures and by the lethal issue resulting in the absence of prompt recognition and surgical relief. While various portions of the brain may be the seat of abscess formation, the temporosphenoidal lobe and cerebellum concern the otologist more than any other portions, as these areas are the most frequent site of secondary infection from the temporal bone. Cerebellar abscesses as far as their primary origin is concerned, may be classed into two groups, those due to infection by way of the labyrinth, through the petrous portion of the temporal bone and a second class in which the infection is derived from the mastoid process. The latter is the form which I desired to consider here.

The location of the pus collection in the cerebellum when derived from the original mastoid focus, is practically more or less constant in the anterior portion of the lateral lobe and on the same side as the area of bone necrosis, although in rare instances, multiple, discrete abscesses have been found on autopsy. Moos records a singular case in which the cerebellar abscess was on the opposite side to the diseased ear and was also associated with a cerebral abscess on the same side as the ear affected. The source of infection, if far back in the mastoid process, will produce the brain

lesion in the posterior part of the cerebellum, the direction in which the ear disease may be propagated varying as shown by Pitt, with the position of the sulcus for the lateral sinus.

While the groove varies considerably in different cases, in some temporal bones it is found well forward and in very intimate relation with the mastoid cells, so that the presence of a necrotic area in this vicinity, would greatly aid in facilitating the spread of the infection backward toward the cerebellum. For should this slight barrier break through and an extension of the purulent process take place through the inner wall with a circumscribed meningeal infection, this portion of the encephalon will inevitably be the seat of the pus collection. The sigmoid groove thus plays a prominent part in the conveyance of the infection, although the osseous lesion as regards its primary inception is less directly in relation with the abscess cavity than is usually the case with cerebral abscesses.

The thickness of the entire mastoid wall also acts as a restraining factor, particularly in children, the rare occurrence of cerebellar abscess in the very young from this locality, depending as shown by Gruber, upon the fact that the bony material intervening between the mastoid antrum and the cranial cavity, exists in relatively larger amounts in early life, than at a later period. But at any age, should this intervening layer of bone undergo destructive changes as the result of a mastoiditis and the suppurating process convert the sinus into an abscess cavity, the chances are largely in favor of a subsequent cerebellar abscess provided the patient does not succumb to the sinus phlebitis or infective meningitis. The brain abscess however, does not in all cases necessarily follow the mastoiditis directly, but may arise from an infective sinus thrombosis or an epidural abscess.

The large proportion of the cases of this class not being dependent upon an acute ear affection, as cerebellar abscess from this cause is very rare, but rather from an exacerbation of a chronic or latent focus of infection in the mastoid cells, which has been incited to renewed activity by some recent irritation. Such a case being reported by Kirkland in a boy of sixteen years, where the aural trouble has existed for three years. There was intense pain in the left ear, the tempera-

ture was 103° F., the mastoid was swollen and when the latter was opened it was found to contain but a few drops of pus. Severe occipital pain, left optic neuritis, vomiting, giddiness and drowsiness with a normal temperature and pulse then ensued and the skull was trephined one inch above the suprameatal wall with a negative result. On the following day the skull was again trephined over the cerebellum and a half dram of foul pus was evacuated, with the ultimate disappearance of the bad symptoms.

In other cases the inner mastoid wall may remain perfectly intact and the infection will travel through the small channels in the bone by way of the minute veins running from the surface of the cerebellum to the lateral sinus and from this location to the mastoid interior. The following case in which the infection was traced directly from the mastoid cells, resulted in a successful termination after operation :

L. G., male, aged thirty years; has had otorrhea of the right side for ten years, but no serious symptoms were complained of until one week before he was first seen, when giddiness and pain over the mastoid region developed. The mastoid was swollen and tender, with bulging of the wall into the canal and usual signs of a chronic otitis were present with a perforation in the posterior inferior segment of the drum membrane. He also complained of a gradual loss of weight and there was facial palsy on the same side as the mastoid disease. Anorexia, constipation and foul breath were also present, with beginning optic neuritis. Vertigo was the most prominent symptom, while nausea and vomiting were also occasionally present. Intense pain was complained of over the occipital region on the right side, with sluggish reaction to light of the dilated right pupil, and the temperature was 97.2° F., while the pulse varied between 60 and 70. Physical weakness was extreme, the gait was staggering, there was weakness of the right arm, exaggerated knee-jerk and the patient lay on the left side.

Cerebellar abscess following mastoid disease was diagnosed and immediate operation was advised and consented to by the patient. Under ether anesthesia and with the usual aseptic precautions, mastoid operation was first performed and considerable greenish pus and necrosed tissue was found

occupying the mastoid cells, while a minute sinus, with a corresponding small area of necrosis, led into the sigmoid groove. This was removed and the sinus was found to be somewhat discolored but otherwise healthy, while the dura was bulging into the wound. The brain membranes were opened and a grooved canula was plunged into the cerebellum, when about half an ounce of fetid pus was evacuated. Introduction of the encephaloscope showed a firm, resisting, limiting membrane. The abscess cavity and mastoid wounds were gently washed out with a 1:5,000 bichlorid solution and a gauze drain inserted. The temperature ran an erratic course for several days, but at the expiration of a week all of the severe symptoms had disappeared. The abscess cavity continued to discharge for two weeks when it ceased and the patient rapidly made an uninterrupted recovery.

The frequency of cerebellar abscess, as compared with the intracranial complications of mastoid disease, is but small; Barker believing, from his experience, that less than a tenth part of the ordinary complications of aural disease consists of this form of pus collections. While Gradenigo in a study of 68 cases of mastoiditis, found endocranial complication in twelve and of these but two were cerebellar abscesses. As regards the proportion of cerebellar to cerebral abscesses one may safely say that of all encephalic pus collections of otitic origin at least 25 per cent. are located in the cerebellum and that the majority of these are in the anterior surface of this portion of the brain, in immediate proximity to the sigmoid groove. Körner, in one hundred cases of brain abscess, found the cerebellum alone involved in 32, while in six cases both cerebrum and cerebellum contained a purulent focus. He found twice as many in males as in females and also agreed with the majority of observers that they were more common on the right side. Allport, in 169 cases, found 31 in the cerebellum; Jansen, in 16 otitic brain abscesses found 9 in this locality, a quite unusual experience; while Picque and Ferrier, in 119 instances found 24 in the cerebellum, 4 in both this locality and the cerebrum and 1 in the peduncle. Barr, in 76 cases, found abscesses 13 times in the cerebellum. In children as before mentioned, it is quite rare in this location, although one may be safe in estimating the per-

centage here as compared with all encephalic abscesses, at from 15 to 20; the greater development of the pneumatic spaces in the adult, increasing the predisposition to cerebellar abscesses as a complication of mastoiditis.

The symptom-complex of cerebellar abscess, while irregular and at times far from characteristic of the lesion present, may in some cases allow of the grouping of the symptoms, so that four stages of the process may be fairly well distinguished. The first commencing with the symptoms signifying the extension of the infection from the mastoid process to the cerebellum and classified as the initial onset of the local infection. This is followed in the majority of cases by an arbitrary second stage characterized by mild discomfort in which the disease remains latent and usually is not recognized. The third stage supervenes at a longer or shorter period of time and the symptom group of this period is characteristic of a severe otitic intracranial infection, sometimes with symptoms pointing to a localized cerebellar abscess, while more frequently, the pus collection is only localized after the parts have been explored by operative procedure. When, however, this stage is not recognized and the intracranial condition is allowed to continue without surgical relief, the fourth or terminal stage of the disease is an essential sequence, manifested by exhaustion, coma and the gradual death of the patient, or by sudden death from rupture of the abscess into some vital portion of the brain axis.

The initial or formative stage of cerebellar abscess, presents no definite signs as regards localization of the disease, but the usual symptoms present at this time are those of an acute extension of the mastoid suppuration to the intracranial contents and are usually more characteristic of a sinus thrombosis or a localized area of meningitis, than of a cerebellar affection. A temperature that is already high as a result of the preëxisting mastoiditis, becomes a degree or more so, the pain over the mastoid region becomes more severe and may extend back over the occipital region, while vomiting may occur once or twice and then disappear or the symptoms may increase in severity and operative interference be indicated on account of the associated morbid pathology. In a large majority of the reported cases, however, the onset of the

intracranial complication if acute, as here described, was unnoticed, or the infection was gradual, probably covering a period of many weeks or months and passing into the second or latent stage, with a subsidence of any of the acute symptoms that might have been present.

Even more so than in the first stage are the symptoms at this time indefinite and often not of sufficient prominence to attract attention to the aural disease as the cause of the gradual failing in health, with frequent periods of intense headache, varying anorexia, more or less depressed mental condition and fairly well marked aprosexia. If a thorough examination were made at this time, an intracranial lesion at least would be suspected, but unfortunately such is not the case and if the patient seeks advice at all, he is usually treated for some vague general condition and an opportunity is lost which cannot be regained. Such a case came under my direct observation, several years ago, in a young man of twenty years. He had been in previous good health except for a suppurating right otitis which discharged at irregular intervals, but not enough to cause him any concern. Then the mastoid became painful and swollen, but under local medical treatment by his family physician, soon disappeared and nothing further was thought of it. It was noticed, however, that he gradually began to lose weight, to complain of frequent occipital headache and to have attacks of nausea and vomiting. His mental condition became dull and he would deliberate in answering even a simple question for several minutes before he gave a reply. This continued for several months, during which time he was taking medicine for a supposed gastritis and finally the symptoms enumerated became so marked, that he was referred to a hospital for a further study of his condition. Seventy-two hours later he died from a large cerebellar abscess which had ruptured into the ventricle, as shown by autopsy.

The third stage like that of the others, of course presents no fixed boundary lines, the transition from one to the other being gradual and usually not recognizable, but for purposes of study, these cases admit of some differentiation of symptom groups with their pathologic stages. At this time the full complement of symptoms have become well developed, and,

according to v. Bergman, can again be profitably subdivided into three groups: the general symptoms; those due to pressure and local pathologic changes; and the localizing symptoms.

Of the general symptoms physical weakness usually becomes more pronounced as the abscess develops and the muscular asthenia is especially marked on the same side as the pus collection, being chiefly confined to the arm. The muscular weakness may also be evident by the conjugate deviation of the eyes toward the unaffected side from asthenia of the ocular muscles and not from direct special nerve involvement. This muscular atony, whether local or general, develops most insidiously and may be the first symptom noted; its importance in connection with other symptoms being considerable as indicative of a brain abscess. A gradual impairment of the appetite, sometimes amounting to complete anorexia, may also be present, but in conjunction with a coated tongue and a peculiar yellow color of the skin, is indicative only, like the majority of the symptoms, of a septic intracranial condition and like those present in many grave diseases, is dependent upon the gradual absorption of septic material and its resultant action on the general organism.

The symptoms due to pressure and local pathological changes vary in almost every individual case, but the presence of headache is fairly constant in all, usually being the earliest and most conspicuous symptom. It is occipital in location and while very intense, is increased by pressure of percussion especially over the region of the abscess. Generally constant, at times it is not so severe, but again becomes almost unbearable. Rarely it may involve the frontal region and then of course, greatly interferes with the recognition of the pus collection, but as a rule it is situated in the former position, being duller in character and more limited in extent than that due to other intracranial lesions. Sometimes it may be the only practical symptom of importance for a time, as in a case reported by Heiman, of a man of twenty-four years, with sudden onset of a headache increasing in intensity, following the suppression of an aural discharge. No characteristic symptoms were present but in addition to the headache he had some fever and pain

in the ear. Death occurred within twenty-four hours after the beginning of the headache and the autopsy showed a ruptured cerebellar abscess in the process vermicularis.

Nausea and vomiting are almost always present but are not necessarily characteristic of cerebellar abscess. In connection with other symptoms and especially with unsteadiness in gait, vomiting may assume more or less of a characteristic aspect and then depends to a great extent on pressure exerted upon the middle lobe of the cerebellum. In connection with dizziness, vomiting has also been of great value in making a diagnosis as shown by Green and Crombie. Vertigo is present in nearly all cases and may be associated with a loss of the sense of equilibrium, the patient presenting a staggering gait. Or in the sitting posture the head may fall forward, then turn toward the unaffected side and continue to move with pendulum-like oscillations, this condition is extremely rare however and in such cases, the vertigo is a prominent symptom, being constantly kept up by the head movement.

The mental functions are usually disturbed and at first somnolence is common, but may be in isolated instances replaced by a condition of sleeplessness, this being the only symptom for which the patient seeks advice. The mental state may often furnish valuable information especially when the patient is irritable at times, while at others he may be inattentive or the hebetude as the disease advances, gradually giving way to stupor. Sluggish cerebration may be quite noticeable and the peculiar condition may exist in which, if a simple question be asked the patient, he will not appear to have heard it and no notice will be taken for a time, then in a few minutes he will begin to answer slowly and deliberately, dwelling carefully on each word, but the final answer will be correct.

The temperature at this stage is of much value as a symptom of brain abscess, but gives no information as regards the site of the pus collection. Oscillations of the temperature are as a rule not present, and it remains fairly constant at or near 99° F, after the initial rise due to the primary extension of the disease to the cerebellum. Very often it is normal or subnormal and when the latter is continuous in connection

with an aural lesion, the presence of intracranial abscess may be fairly well assumed. In some cases the diagnosis in great part will hinge on this symptom, a case in point being that seen by Morris, where the low temperature in connection with a subnormal pulse rate, led to the diagnosis of brain abscess, but precise localization was impossible. The autopsy showing a cerebellar abscess on the same side as the diseased ear. The pulse is also slow, regular and of fair volume and remains unchanged in uncomplicated cases, but it may be normal and occasionally become intermittent. An instructive case in this connection being seen by Schwartz, in which the prominent symptoms were intense, intermittent pain in the occiput, nausea, vomiting, subnormal temperature, irregular pupils and a rapid pulse of 100 to 150. No operation was performed, as the rapid pulse was considered incompatible with a cerebellar abscess, but the necropsy showed an abscess in the right cerebellar hemisphere, with circumscribed leptomeningitis and pachymeningitis interna and the cause of the rapid pulse rate was readily explained by the finding of a chronic endocarditis. Respiration is usually regular, but often slower and more shallow than normal.

Of the minor symptoms of this class, which are variable and may or may not be present in the given case, cervical contracture is one of the most frequent, the muscles of this region may also present varying degrees of rigidity and from the same cause, clenching of the teeth may occur infrequently. The tongue may be protruded toward the unaffected side, making the speech slow and indistinct, if it be swollen. Rigors occur infrequently, the bowels are constipated and the knee-jerk may be increased on the same side as the brain lesion. Walker reporting a successful case following operation, in which the only characteristic symptom was the increased knee-jerk.

The localizing symptoms are of little value in this affection, although Burnett states that double optic neuritis is likely to be present, because the abscess readily interferes with the circulation of the cavernous sinuses and the ophthalmic veins. Very often this may be the only positive symptom, but again the eye-grounds may remain normal even in fatal cases, as has been shown by Woodward. Hansberg believes that lo-

calization of a cerebellar abscess is almost impossible from focal symptoms, but he considers bilateral choked discs as the only sure sign, while Gradenigo states that lesions of the optic papillae are observed in about one-half of these endocranial complications and they should be carefully sought for, as they are frequently the first and only indication of intracranial involvement. He further states that the papillitis affords no information in regard to the location of the lesion.

Nystagmus and paralysis of the sixth nerve may point to a lesion in this locality, the paralysis of the abducens producing strabismus, as in the cases seen by Barling, one of which had this nerve affected, while both presented horizontal nystagmus. The pupils may vary in size, the more dilated being on the side of the abscess and there may be inability to close the eyelids, with facial paralysis on the same side; this and paralysis of the oculomotor nerve may be the only localizing symptoms. Should facial paralysis occur it will probably be due to pressure of the abscess on the nerve in the pons, but as is frequently the case, a large abscess may be present and yet produce no localizing symptoms. Cerebellar ataxia and vertigo are usually due to lesions of the worm, while if the medulla be affected to a point low enough, the varied paralyses may be unilateral and on the same side as the abscess, if, however, the pons be involved more on the side of the abscess, the paralysis will be apparent on the opposite side. Macewen has well said that in all cases the symptoms of cerebellar abscess "depend upon the level of the pressure," but one may conclude that local symptoms are not usually present unless the abscess develops to the point of invading the middle lobe or the peduncle, when the so-called cerebellar ataxia develops.

The terminal stage is one of gradual death from exhaustion and coma; or sudden, depending upon the direction in which the abscess ruptures. When the pus breaks into the ventricle, the condition changes at once, the temperature rises suddenly to 103° or 105° F., the pulse becomes rapid, respirations are frequent, while there are muscular twitchings, convulsions, coma and death. When, however the abscess ruptures upon the free surface, a secondary, in-

flammatory reaction ensues leading to acute purulent leptomeningitis. The temperature becomes high and the pulse rapid and the symptoms of meningitis are fulminating, ending rapidly in the death of the patient.

The complex of symptoms, as seen in cerebellar abscess, is well exemplified in a study made by Green of four cases, in which headache as a prominent symptom was bilateral in two, frontal in one and vertical in one. No occipital headache being present in any of the cases. Paralysis of the abducens occurred in two, of which one was bilateral and one unilateral and on the opposite side from the ear disease. Optic neuritis was seen in only one case. One had general septicemia, while in the others, fever was not apparent at any time. Nystagmus on looking away from the diseased ear was present in but a single case. The abscesses were in the anterior lower portion of the cerebellum on the same side as the ear disease and in all the cases an accurate diagnosis before the operation was impossible. Leucocytosis was found in those in which the examination was made for this phase, but as the author well states, it is found in nearly 80 per cent. of uncomplicated tympanic suppurations and therefore possesses no diagnostic value in this connection.

Hammond, in five cases, based his diagnosis upon the following complex of symptoms which he regards as characteristic, being confirmed by operation or autopsy. Present or previous suppuration in the sinuses adjacent to the brain, rapid loss of flesh and strength, rapid pulse and high temperature for the first seventy-two hours, followed by a decline in the temperature and an increase in the heart action. There is also pronounced flexure of the extremities, progressive dilation without fixation of the pupils, semi-unconsciousness with uncontrollable restlessness and a peculiar indisposition to obey any request that may be made. Glycosuria, slow respiration and a tendency to go toward one side are present, while there is also a swinging of the hands toward one side, with an entire absence of paralysis.

The two groups show very well the multiplicity and confusion of symptoms, and it is only by the careful study of the individual case from all sides, that a diagnosis can be

made and the value of the symptoms even approximately estimated.

The pathologic changes in the primary bone infection consist of an area of necrosis at the point where the plate of bone separating the sigmoid sinus from the mastoid cells is extremely thin, so that erosion, as shown by Bacon, is apt to be at this point. The bone becomes discolored, softened and granulation tissue develops, while a collection of pus is found either between the sinus and bone, or behind the sinus in the direction of the occipital bone and by means of the small veins or arteries the infection is carried into the cerebellum. Or, as before mentioned, there is a direct contact between the sinus and the cerebellum, by means of the dura. This phase of the necrosis, as seen in the sigmoid groove, may be of great diagnostic value, as indicating the course of the infection toward the cerebellar region, when an exploratory operation is performed in the absence of definite localizing symptoms.

Wherever the abscess is situated, its development is usually accompanied by that of other intracranial complications, as sinus phlebitis or a small limited area of meningitis, and it is usually single, but they may be multiple and involve the cortex or deeper regions on one of both sides. Even when single, as is more frequent here than in cerebral abscesses, a smaller pus collection may be found in close conjunction with it, or an abscess here may coexist with one in the cerebrum. As the majority of abscesses in this location are chronic in character, they become capsulated by a definite lining membrane, varying in thickness from 1 to 5 mm. and although this acts as a barrier to the further spread of the infection, yet in some instances, this conservative barrier is absent, the abscess being surrounded only by a zone of softened brain substance. Whether encapsulated or not, there is always present the tendency toward greater growth and the size is extremely variable, some containing but a few drops of pus, while from others, three or four ounces may be evacuated, a case in point being seen by Woodward, in which the entire white matter of the left hemisphere of the cerebellum had broken down into an abscess cavity. The pus found in the abscess does not usually differ from that found at the origi-

nal focus of infection and it may be thick and yellow, or thin, greenish and offensive, at the same time containing particles of broken down cerebellar tissue.

The following case of cerebellar abscess was seen in consultation a short time ago and well shows the difficulty of diagnosis:

M. J., male, age fourteen years, presented the following history. The right ear had been discharging for two years following an attack of *la grippe*. He had been under treatment more or less constantly for the otitis, with the cessation of the discharge at times, but with its recurrence after attacks of coryza. He has lately complained of occasional dull pain over the mastoid and has become irritable, with, in addition, a considerable loss of weight. The discharge at times would become excessive in amount and the pain in the head would then become greatly aggravated. At the time I first saw him, the pain and restlessness were marked, the mastoid was not swollen, but pressure produced flinching. There was a small perforation low down in the drum, with considerable purulent discharge and a macerated appearance of the canal, but no definite areas of redness or swelling. The temperature was 98.6° F., the pulse 74 and the respiration normal. The middle ear was cleansed and drained with a small gauze wick, an ice bag was placed over the mastoid and sedatives were given internally. He only slept a few minutes at a time during that night and on the following day the symptoms had increased, although the appearance of the parts remained apparently unaltered. No other symptoms than those mentioned were present and the eye-grounds remained unchanged,

Operation was then advised and under ether anesthesia, the mastoid was opened. The cortex was exceedingly dense and no pus was found until the antrum was reached, which contained a few drops of purulent matter. Free communication was established with the tympanic cavity, a small patch of necrosis was removed, the wound was dressed in the usual manner and an improvement in his condition became noticeable in a few hours, the headache ceased and he had a good night's rest. This improvement continued for a week, when he became restless, was constantly annoyed by

trivial matters and his temperature, which had been normal, fell to 97.2° F., while the pulse was 64. I then saw him again and found him very irritable the right pupil was dilated, he complained of the light and the optic papilla was slightly swollen while he was losing flesh and strength rapidly. The mastoid wound was to all intents normal, but was redressed and when I saw him on the following day, he was semi-conscious, there was a slight stiffness of the nucha. A diagnosis of brain abscess was made, supposedly located in the cerebellum.

On account of his grave condition, it was deemed best to immediately explore the cerebellum and delay opening the mastoid wound, as it seemed perfectly healthy. A trephine opening was then made in the usual situation over the cerebellar region and when the button of bone was removed the dura was seen to be somewhat inflamed. A small incision was made in the dura and a hollow needle inserted into the lobe of the cerebellum, when, after encountering dense encapsulating wall, five drams of pus were evacuated. The abscess cavity was washed out, drained and the usual dressings applied. The patient seemed to rally well from the operation, but died twenty-four hours later from apparent asthenia. A partial autopsy only was allowed, but it showed that the sinus was involved and the infection had reached the cerebellum through the small veins, from a minute purulent and necrotic focus well back on the inner mastoid wall.

Of all the intracranial complications resulting from mastoiditis or other suppurative affections of the organ of hearing, cerebellar abscess is undoubtedly the most difficult to localize. And, as has been shown by Gradenigo, neither optic neuritis, lateral nystgmus, titubation, vertigo, nor rigidity of the nucha are special symptoms. In many cases the location of the lesions one finds in the course of a mastoid operation with symptoms of endocranial abscess such as caries of the sigmoid groove, with thrombosis of the sinus, will be the only indication that the pus collection is probably situated in the cerebellum. In the cases where a diagnosis is made in advance of operation, it is only by the careful study of the complete symptom-complex, as it is almost im-

possible to do so from focal symptoms alone, and when recognized early it is more often by a process of exclusion, rather than by any definite signs or symptoms.

The difficulties of recognition are also often enhanced by the frequent presence of complicating factors such as pyemia, sinus thrombosis or meningitis. In sinus thrombosis, rigors, high temperature, and increased heart action, are almost always present, while in leptomeningitis there is high temperature, rapid pulse and marked irritability of the special senses as predominating symptoms. Heiman believes that if due consideration be given to all the symptoms, an accurate diagnosis can be made in three-fourths of the cases, and while it is not of much value to place reliance upon single symptoms, yet in many cases one can be fairly sure of the presence of a cerebellar abscess, when certain groups of symptoms are studied in relation with one another. Cerebellar abscess may materially lower the temperature in the presence of a complicating sinus thrombosis and when a case of suspected intracranial complication is seen, the factor should be thought of. Achard and Bellanger believe that paralysis of the arm of the affected side with muscular weakness of the legs, exaggerated patellar reflex on the same side and conjugate deviation of the eyeballs toward the unaffected side, are especially indicative of this condition. And, as has been suggested by Church, in this connection, the x-rays may be of service here, the same as they have been of use in cerebellar tumors, but no cases have been recorded as yet of their value in this field.

In the differential diagnosis between temporo-sphenoidal and cerebellar abscesses, the usual error is to mistake the latter for the former, but the localizing symptoms of cerebral abscess are usually present sooner or later, and if a decision cannot be made, an exploratory operation will be of great help. Examination of the visual field may yield valuable information, but choked disc alone simply indicates an intracranial lesion and is not characteristic of an abscess in this locality and does not explain the nature of the lesion. Grant reports two interesting cases, in one the diagnosis was rendered more difficult by the presence of labyrinthine symptoms, while in the other, both ears were affected and rigors were

very prominent, due to other complicating factors. Disease of the labyrinth and semicircular canals may account for some of the symptoms as in a case reported by Bacon, with slow pulse, vertigo, vomiting, deafness, headache, etc. In this case a cerebellar abscess was supposed to be present, but the operation showed caries of the semicircular canals. In Meniere's syndrome, the headache is neither so violent, persistent, nor localized, and while in cerebellar abscess the somnolence and stupor may increase as the disease progresses this is not the case in the former.

Subnormal temperature is often present after influenza or other depressing diseases, but it is usually of short duration and not continuous like that of cerebellar abscess, while rapid emaciation may be due to the same causes, but when, in addition, the temperature is low, and there is constipation, sluggish mental action and localized pains in the head, the diagnosis is strongly in favor of the cerebellar lesion. The cerebellar gait, so-called, while of strong presumptive evidence, may be due to irritation of the auditory nerve or semicircular canals, as has been shown by Starr, and a similar syndrome be produced by defective aural drainage, without the presence of abscess at all, the symptoms being relieved after the defective drainage has been rectified. Tumors of the cerebellum, such as glioma, tuberculous, etc., may produce symptoms very similar to abscess, but the differentiation can usually be made by the presence of other factors resulting from pressure on surrounding parts.

The early stage of the abscess formation, corresponding to the initial infection from the mastoid, may last only for a day or two, or a week at the utmost, while after these acute, primary symptoms have subsided, it may remain latent for a number of years, being incited to renewed activity by the development of a new inflammation of the original focus of infection. One, and possibly two, extraordinary cases have been reported, in which the abscess spontaneously evacuated through a carious opening in the sigmoid groove, but such a result seems hardly credible and one should never, for a moment, anticipate such a termination. The usual tendency of the abscess, if not operated on, is to cause death by pressure edema of the surrounding parts, or to perforate extern-

ally with resulting meningitis; or internally, into the fourth ventricle, with immediate death from cardiac and respiratory paralysis.

While the patient will invariably die without operation, yet the success obtained in this field has been so promising that one is justified in operating as soon as the diagnosis is made, but in some cases one may wait a short time for the development of any symptoms more closely indicating the location of the abscess.

As the only treatment for cerebellar abscess is surgical, the primary focus in the mastoid should, as a rule, first be exposed and the tract of the infection traced, if possible, to its results further back. Bergman states that with a history of ear disease, persistent sleeplessness and a continuous temperature of 99 F., one is justified in opening the cranium, but the otologist may wait for localizing symptoms or until a condition of hebetude is well pronounced, before interfering. The advantages of delay are, that the location of the abscess may be more apparent latter on, while the danger to the patient is not materially increased. As pointed out by Branwell, in cases where the diagnosis is uncertain, the operation adds but little to the risk.

It is always advisable, after cleaning out the mastoid, to expose the sigmoid sinus, while to get at the inner surface of the mastoid, the posterior portion of the bone can be removed until the dura is fully exposed for at least 2 cm. behind the lateral sinus; exploration can then be made in the cerebellum in any direction to the depth of $3\frac{1}{2}$ cm. inside of the lateral sinus. In exploring, in the absence of a precise diagnosis and in the presence of grave symptoms, it is best not to incise the dura, as the hernia which sometimes follows is a serious complication and should not be incurred, unless in the presence of immediate danger or when the diagnosis is probable. Intervention should, at times, be limited to exploratory puncture and aspiration. Gradenigo in one case by this method, aspirated fragments of cerebellar tissue and excluded a deep abscess, without in any way injuring the patient.

The general routine of procedure in these cases has been well mapped out by Pritchard, and he advises to first open

and explore the mastoid cells and antrum. Failing here to find sufficient disease to account for all the symptoms, open the cranium in the groove for the lateral sinus and so obtain access to both the middle and posterior fossa. Then examine the lateral sinus and search for both extra and intradural abscesses. Treat the sinus as indicated by any pathological changes present, and if the sinus is not thrombosed, explore the cerebral substance above and the cerebellum below the level of the horizontal groove of the lateral sinus. If there is an urgent need of operation and the diagnosis is fairly established, the brain cavity may first be opened over the supposed site of the abscess and the mastoid operation performed later. But the aural lesions should receive attention immediately thereafter, or, if the condition of the patient is such that this is impossible, the mastoid should be operated upon subsequently. But it should always be remembered that the aural lesion is the original cause of the brain disease.

When the mastoid is sclerosed or eburnated, or for any reason that will make the ordinary operation inadvisable, the skull may be opened from 5 to 7 cm. back from the edge of the osseous meatus, just below the superior curved line of the occipital bone and on a line drawn from the inferior osseous edge of the orbit to the occipital protuberance. The technic for opening the skull here is the same as in other situations, but the pus in a cerebellar abscess is apt to be so thick that it will frequently not pass through the ordinary needle, and after the dural flap has been raised, it is best to use a large grooved exploring needle. If pus be found, the cerebellum is freely incised with a probe-pointed bistoury and the abscess cavity is evacuated and a proper drain inserted.

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ABSTRACTS FROM CURRENT OTOLOGIC, RHINO- LOGIC AND LARYNGOLOGIC LITERATURE.

I.— EAR.

The Importance of the Surgical Treatment of Chronic Middle Ear Suppuration.

EDWARD BRADFORD DENCH, New York. (*Medical News*, Oct. 17, 1903.) Statistics are given which seem to show that over one per cent. of all cases of chronic suppuration will develop some severe intracranial lesion. When the radical operation for chronic middle ear suppuration is done, every vestige of diseased bone ought to be removed, nor should the surgeon stop until this is done and all sinuses, no matter how small, explored. Details of the operation are given, one point especially being insisted upon, namely: the careful inspection of the internal tympanic wall and the removal of all softened bone, which bone should be removed as thoroughly and as freely when necessary as in the neighborhood of less important structures. "It is useless to perform an operation of this kind and to leave any softened bone, although in its removal the horizontal semicircular canal may be opened or the aqueductus Fallopii may be entered and the facial nerve exposed." Vertigo, after injury of the semicircular canal, will very likely be of short duration only. The author likes to line the entire bony cavity when possible by means of Thiersch grafts, held in position by small pledgets of cotton. He has had extremely satisfactory results in these operations, the first dressing being done on the fifth or sixth day, at which time the posterior wound will be entirely healed. In some cases the ear has been practically dry in two or three weeks. Out of 70 cases operated upon by this radical procedure, 54 were cured, 11 improved and 5 were under treatment.

While the removal of the ossicula and the curettage of the tympanic walls improves many cases of chronic suppuration, it will not absolutely stop the discharge unless all diseased bone has been reached. This operation of ossiculectomy is justified in a certain proportion of cases. The surgeon should usually warn the patient that the operation may not give complete relief and that later the more radical procedure may be necessary. Where the aural discharge is persistent and profuse, the author regards the radical operation as the operation of election.

Richards.

Tuberculosis of the Middle Ear, With the Report of a Case

Z. L. LEONARD, New York. (*Medical News*, July 4, 1903.) Tuberculosis of the middle ear, while rare, is a cause of chronic purulent inflammation. It has usually been thought to be secondary, but the writer's case would seem to be one of primary trouble, though he says infection may have come from the pharynx. It is characterized by the constant appearance of a purulent discharge without pain, followed by progressive destruction of tissue. The initial discharge may come through several small pin-hole perforations, which soon run together, forming one large circular perforation, with thick, everted edges and blueish-white edematous look. Deafness is noticed early. There is loss of bone conduction and lowering of the upper tone limit. Discharge is not usually foul in odor. Treatment is similar to that pursued in any case of purulent discharge from the ear, together with such measure as are necessary to safeguard the general health.

Richards.

Indications for the Performance of the Mastoid Operation.

WILLIAM C. BRAISLIN, Brooklyn, N. Y. (*Medical News*, December 27, 1902.) A review of conditions under which the mastoid operation is demanded.

In acute cases, many of which will recover completely without operation, the author is inclined to be conservative, though not extremely so.

Extreme continued pain over the mastoid, with tender-

ness, varying temperature, general prostration, especially in the presence of a ruptured drum membrane, are indications for operation which should not be postponed for more than twenty-four hours. In subacute cases, where the pain is of variable character as well as the temperature, decision may be difficult, but a history of the patient, the general physical appearance and a study of the temperature chart for a few days will usually determine. Opiates ought not to be administered, as they mask the symptoms.

Richards.

The Indications for Operative Intervention in Middle Ear Suppuration.

BARTON H. POTTS, Philadelphia. (*American Journal of the Medical Sciences*, July, 1903.) Profuse, long-continued discharge is suggestive, but not diagnostic of antrum or mastoid involvement. Tenderness over the mastoid, an inflamed, tender, bulging upper and posterior canal wall, and a sinus, whatever its location, leading into the mastoid are the most positive indications for operation. In cases of pyemia, rapid fluctuations of temperature through a range of several degrees is the most important sign. The slow, thready pulse, out of proportion to the elevation of temperature, with irregular or sluggish pupils, rapid failure of health, rigors or convulsions are signs of intracranial pressure which should demand immediate operation.

Richards.

The Prognosis and Treatment of Chronic Deafness.

PHILIP D. KERRISON, New York. (*Medical Record*, November 21, 1903.) Ninety-five per cent. of all cases of deafness are due primarily to tympanic disease or to disease in some part of the conducting apparatus. Chronic tubal catarrh in which there is marked narrowing of the Eustachian tubes, and chronic hypertrophic catarrh of the middle ear, in which the tympanic mucosa and all the joint structures of the ossicular chain may be involved, is very much improved by the re-establishment of the Eustachian tube to

to its normal condition and caliber and the restoration of the tympanic membrane as nearly as possible to a healthy condition. To bring this about, inflation by catheter at regular intervals; the application of astringent solutions to the nasopharynx and pharyngeal mouth of the tube; medication of the tubal mucosa by stimulating vapors; mechanical dilation by graduated bougies, or by electrolysis are all of great value; the patency of the tube once obtained, being maintained by occasional gentle inflation, together with pneumatic massage of the membrani tympani in order to exercise the ossicles and restore their mobility.

Deafness due to suppurative processes in the middle ear is usually less than would be expected considering the apparent damage to the conducting apparatus. Most patients of this class apply for treatment, not on account of deafness but for the relief of a chronic purulent discharge. When they seek relief on account of the hearing, the stapes may be found buried beneath the mass of cicatricial tissue, and the logical treatment would be the division and removal of this tissue. When this is done there is often an immediate brilliant result, but as the operation wound heals the initial gain is almost invariably lost, though the final net result may show an appreciable improvement.

Chronic hyperplastic otitis media or dry catarrh is the most discouraging form of deafness which the otologist has to treat. It is apparently a productive inflammation from the start, in which the newly formed connective tissue contracts, pressing upon the normal structures of the tympanic mucosa, which is converted into a dry, sclerotic membrane, closely adherent to the tympanic walls. The same changes are often found in the mucous lining of the Eustachian tube, the passage of which may be abnormally wide, while the drum membrane is usually not retracted. The deafness is due to impaired mobility of the ossicular chain, and the ankylosis is very apt to be a true one. Although the drum membrane may be normally placed and free, the ossicles are held by constricting bands which bind even the stapes to the walls of the oval niche and window. In the initial stages some beneficial results may possibly occur from the use of stimulating vapors thrown into the middle ear

cavity through the catheter, together with forcible inflation at long intervals. Surgical aid has been proposed to remove under the most rigid aseptic precautions the drums, malleus, and incus, great care being observed to separate the incus from the stapes without injuring the latter or dislodging it from its position within the oval window. The writer himself has never felt justified in advocating this operation, nor have the results of such cases as have been operated upon seemed altogether favorable, although the immediate result of the operation is probably almost always a decided improvement in hearing. The after-danger lies in the tendency of adhesions to re-form between the stapes and adjacent structures, the prevention of which is very difficult if not impossible.

Richards.

Carbonic Acid Apparatus for Inflation of Eustachian Tube.

LUCAE. (*Int. Centralbl. f. Ohrenheilkunde*, No. 6. Bd I.) The author has designed an apparatus for the inflation of the Eustachian tube by means of compressed carbonic acid. The bottles filled with 5 kilos of fluid carbonic acid is connected with a manometer which regulates the pressure. The author has used the apparatus very often and has never seen untoward results from its use. The reddening of the promontory seems a little greater when carbonic acid is used than when ordinary air is used.

Anomaly in the Position of the Sinus.

RITTER. (*Int. Centralbl. f. Ohrenheilk.*, No. 6. Bd I.) The operation was undertaken on account of an acute otitis media. The sinus lay so far forward that it touched the posterior meatal wall, so that a part of this had to be removed, and a large part of the sinus was laid bare in order to reach the antrum. After the operation, the patient experienced very severe pain. On changing the bandage, the free lying sinus wall showed itself to be very sensitive to the lightest touch. Orthoform was dusted on the wound with the result that the pain disappeared as soon as its effects commenced, to reappear two days later in a milder form, as soon as the

anesthetic properties grew less. The same observation was made at every change of dressing until the sinus wall was fully granulated over.

Bony Changes Following Chronic Middle Ear Suppuration.

RITTER. (*Int. Centralbl. f. Ohrenheilkunde*, No. 6, Bd I.) The author had performed a radical operation on account of chronic suppuration of the middle ear. The mastoid was sclerosed, and the antrum small; a small fistula led from the antrum into the middle ear. The entire region of the aditus behind this fistula was changed into a sclerosed mass of bone from which a part was chiseled off in order to obtain a view of the cavity. The contour of the semicircular canal was not seen, and no lumen was obtained by the chiseling. The remnants of the hammer were extracted, but the anvil could not be found, and apparently had been incorporated into the mass of bone. After the operation, the wound behind the ear was closed primarily by a Koerner's flap. This became necrotic, and the epidermising of the cavity proceeded slowly. Thiersch's flaps were transplanted, and epidermising followed rapidly. Suddenly most of the newly formed epidermis became necrotic, and it was impossible to prevent its loss. This phenomenon occurred simultaneously with the great cold in November, 1902, so that the author thought of a relationship between these two. The patient was compelled to wear the bandage which had been removed after the closure of the retroauricular wound, and the healing progressed undisturbed.

Otogenous Pyemia, With Pachymeningitis Interna Circumscripta Acuta.

ALEXANDER. (*Int. Centralblat. f. Ohrenheilk.*, No. 7, Bd. I.) The case, where discharge from both ears had existed since early childhood, belongs to the group of the pulmonary forms of otogenous pyemia. When the patient was received, there was already abscess of the left lung and weakness of the heart. The right ear was the starting point for the pyemic symptoms, and at the radical operation a

cholesteatoma of almost the size of a walnut was removed from it; there was also found a fetid thrombus adhering to the wall of the right lateral sinus. As the local pulmonary symptoms increased, and the abscess became bilateral, exitus lethalis was the result. Post mortem showed, among other things, an acute pachymeningitis interna corresponding to the convexity of the right cerebral hemisphere. Arachnoidea and pia as well as the surface of the brain were entirely normal. The case usually result 'in a much greater involvement of the dura. The author's case shows a very early stage of a pachymeningitis interna, such as are seldom observed anatomically, because in the meningeal forms of otogenous pyemia, which these cases usually are, the exitus lethalis usually occurs in a stage where there is an extensive purulent involvement of all of the meninges, and occasionally of the brain. In operations at such a stage pachymeningitis would oftener be seen if we were accustomed to open the intradural space in cases of extensive pachymeningitis externa or purulent change on the mesial wall of the sinus. An opening under these circumstances is equivalent to opening the peritoneal cavity. The author did not ligate the jugular because (1) he had demonstrated metastasis in the lungs, and (2) because the narcosis and operation had to be shortened on account of the weakness of patient's heart.

Keloids of the Lobule.

ALEXANDER. (*Int. Centralbl. f. Ohrenheilk.*, Bd. I. No. 6.) (1) The summary of facts collected by Alexander are as follows: The keloids of the lobule do not show a periarterial arrangement of the fibres. The specimens give no support to Warren's theory of the origin of the keloids by proliferation of the arterial walls. (2) According to the histologic appearances, the growth of the keloid takes place from the normal connective tissue of the corium, which, when hypertrophied, compresses either partially or totally the regional blood vessels and causes their disappearance. (3) The characteristic tumor cells in the arterial walls described by Warren were not found in the tumors examined. (4) In respect to the etiology, the cause of the arising

of keloid of the lobule seems to be the act of piercing the ears, or perhaps the subsequent purulent inflammation of the canal formed and its vicinity, coupled with a predisposition of the patient toward keloid formation. (5) According to experiences on other parts of the body and the reaction of the skin involved, the wearing of ear rings, or perhaps their weight, cannot be regarded as the only cause of keloids. We must assume that a scarcely perceptible new-formation of connective tissue is found at some point in the vicinity of the hole in the lobule (which is caused by inflammation following the piercing of the ear) and this, years later, when the individual's constitution is changed, gives origin to keloids.

Anatomical Findings in Adhesive Processes in the Middle Ear, and their Relation to the Diagnostic Appearance on the Drum.

POLITZER. (*Int. Centralbl. f. Ohrenheilk.*, Bd. I, Nt. 7.) The author bases his conclusions on a large number of cases examined intra vitam, and post mortem, and an observation of the disease extending over years. The newly formed adhesive connective tissue acquires a greater extent and strength in the purulent processes in the middle ear, then in the non-purulent, catarrhal conditions. Still, Politzer has seen in the latter strong bands and bridges which bound the drum to the inner wall of the tympanic cavity. The adhesions caused by the formation of connective tissue affect on the one hand larger or smaller parts of the drum, and on the other the inner wall of the tympanic cavity or the anvil and stapes, or the aural bones lying in the attic and the bony wall of the attic. Politzer distinguishes the surface approximation of the drum to the promontorial wall and abnormal union of the drum and ossicles with the walls of the tympanic cavity by means of thickening bands and membrane. The latter, Politzer considers to be in the majority of cases thickened and hypertrophic folds of mucous membranes which are found in varying amounts, in the tympanic cavity and antrum mastoideum as remnants of embryonal mucous membrane folds. Politzer bases this assertion

on the fact that in all the cases examined anatomically by him the presence of such bridges in the middle ear was connected with just such stellate, branching and thickened connective tissue membrane. Politzer sketches among a large number of very instructive pictures of findings on the drum, the otoscopic appearance of the adhesions in the neighborhood of the drum, and especially emphasizes the diagnostic importance of the changed appearance of the drum when examined with Seigle's speculum, and its importance for the often very fortunate intratympanic operations.

Circumscribed Gangrene of the Cerebellar Dura, Following Chronic Suppuration of the Middle Ear.

HEINE. (*Int. Centralblatt, f. Ohrenheilkunde*, Bd. I, No. 6.) The patient, aged 20 years, who had suffered from childhood with a foul smelling discharge, gave the following appearance on presenting himself: The right mastoid was very sensitive, foul pus was discharging from the meatus; almost total defect of the drum. Conversational tones heard at the ear. The fundi of the eyes showed venous hyperemia, the disc distinct. Severe headaches and torticollis. Sensorium clear. Temperature 38.3 C. Immediate operation. With the first cuts of the chisel, pus and granulations were revealed. The bone in the region of the sinus was greyish yellow discolored, but the sinus looked healthy. Puncture revealed normal appearing blood. The cerebellar dura was discolored for the space of the size of a quarter. Repeated punctures gave no pus. Eight days after the operation, pus bubbled out of a small fistula on pressing on the dura. The bone was removed down to the vertical semicircular canal and a small abscess opened in the dura. On changing the dressings pus still exuded from the depths of the wound; 5 days later, on changing the dressings a piece of the dura, size of a nickel, and a smaller gangrenous piece were removed, whereupon a large amount of cerebro-spinal fluid was discharged, which continued for weeks, gradually growing smaller in amount. The patient acquired tuberculosis of the lungs while in the hospital, which increased in severity and caused his death in six months, As the author learned

of his death too late, he could not make a special post-mortem, and in the regular report of the post-mortem, nothing of importance was found. When patient was first seen the diagnosis of a diffuse purulent leptomeningitis was made. In another case, the lumbar puncture was made which gave purulent cerebrospinal fluid and so confirmed the diagnosis. In this case, only after the removal of the gangrenous part did it become clear that it was a case of circumscribed meningeal gangrene. In the statistics of Koerner, 6 cases of circumscribed gangrene of the dura are reported, 4 from Macewen, 1 from Lucae, and 1 from Somsen, all of which, however, affected the middle cranial fossa, while in this case the cerebellar dura was gangrenous.

Two Cases of Aneurism of the Arteria Carotis Cerebri.

ZUR-MÜHLEN, Riga. (*Archives of Otolaryngology*, Vol. XXXII, No. 5.) CASE 1. A woman, aged 57, with a probable syphilitic history, fell heavily on the right side of her head; for an hour she was totally unconscious and vomited profusely throughout the day. For a time the sense of smell was lost on one side and tinnitus in the right ear has persisted since the fall. Inclining the head to the right and pressing the carotid of that side, lessens and sometimes suppresses the tinnitus, with a stethoscope a loud systolic murmur of uniform intensity could be heard over the entire head; if the right common carotid be compressed the murmur is decidedly weaker. Although the location of the aneurism is to a degree conjectural, yet, because of the temporary anosmia evidently due to pressure on the olfactory bulb, it is probably located at the point where the carotid branches off into the anterior and middle cerebral arteries.

CASE 2. A woman aged 24, when 2 years of age, struck her forehead against the sharp edge of a marble table. When 4 years old, she became unconscious without any apparent cause and remained so for three hours. There were no convulsions. At the age of 10 severe headaches began, at first daily intermittent, later, continuous for weeks and months. For the last 10 years, exophthalmos and dilatation of the veins around the eyes have been well marked.

Upon both sides of the occiput at the place of exit of the mastoid veins one can feel a marked fremitus, diffused backward, upward and downward. With the stethoscope one hears a loud systolic murmur over the entire head. If the right carotid is compressed the murmur becomes less and the palpable fremitus at the right occiput has gone. Simultaneous compression of the left carotid caused complete disappearance of murmur and fremitus. There was bilateral, pulsating exophthalmos, a left hemianopsia, and atrophy of the corresponding halves of both optic nerves, and a hemianopic reaction of the pupils. In the right ear the lower tones were poorly heard, C heard only when the fork was struck very hard. In this ear subjective tinnitus of a severe beating and knocking.

The diagnosis was aneurism or rupture of the right carotid into the cavernous sinus.

¹⁸⁹⁷ Under cocaine anesthesia the common carotid was tied high up in the neck. The eyes gradually receded, the fremitus disappeared, while the murmur was much less perceptible. The severe headaches disappeared, sleep is more normal and there is less tendency to somnolence. The hearing is improved and there is great diminution of the subjective sounds.

Campbell.

On the Pathological Anatomy of Deaf-Mutism.

SCHWABACH, Berlin. (*Archives of Otolaryngology*, Vol. XXXII, No. 5.) In a patient who died of general miliary tuberculosis the author obtained possession of the right temporal bone only. The middle ear presented evidences of the implantation of recent tuberculosis on an old purulent otitis media. In the internal ear the main changes were found in the middle part of the basal turn of the cochlea, where they obliterated the cavity, the peri, as well as the endo, lymphatic spaces, so that nothing was to be seen, of the membranous structures. In the basal turn the auditory nerve and its terminals were diminutive or entirely absent. The aquaeductus cochleae could not be recognized. The aquaeductus vestibuli was clearly seen and presented no changes. Toward the anterior part of the basal turn, the bony, as well

as the connective tissue, new formation diminished gradually and were completely absent in the upper turn.

Campbell.

On Hemorrhage from Arrosion of the Brain Sinuses in Suppuration of the Temporal Bones.

EULENSTEIN, Frankfort-on-Main. • (*Archives of Otolology*, Vol. XXXII, No. 5.) A child aged 5, developed mastoiditis during an attack of scarlet fever. In spite of free paracentesis the tenderness and swelling about the mastoid increased.

Operation disclosed openings leading to the middle and the posterior cranial fossae. The sigmoid sinus showed respiratory motions but its middle portion was covered with granulations and had about it a large extra-dural abscess. Ten days later the sinus wall gave way, but the profuse bleeding was controlled by compression bandages. During the course of the next 4 days, by retention of the secretions, through fear of hemorrhage in changing dressings, the temperature rose to 40.5 C. and a violent chill set in.

A change of dressings was imperative. On attempting to lift the external plug a new hemorrhage occurred but stopped immediately on replacing the tampon. The internal jugular and facial veins were tied in two places and severed and then the lateral sinus was exposed between the knee and the torcular.

While pressure was made on the sinus the dressings were changed without much loss of blood. The general condition from this time on steadily improved.

In reviewing the literature the author finds, including his own, 18 cases on record; of these 13 occurred in chronic suppurations, 4 in acute and 1 no statement. *Campbell.*

General Sepsis in Chronic Suppuration of the Middle Ear, with a Central Perforation of the Drum.

BEZOLD, Munich. (*Archives of Otolology*, Vol. XXXII, No. 5.) The three cases reported occurred in healthy individuals, complicating a form of middle ear inflammation

which experience has taught us to look upon as harmless and thus led to the assumption that the infecting element was very virulent or that it was present in exceptionally large quantity. The predominating micro-organism was in each case the streptococcus pyogenes. In two of the cases there was additionally an otitis externa crouposa and in one of them a furunculosis. The first case was complicated by a tonsillar exudate and in the last on opening the mastoid several dark red glands were cut across. This makes it seem that there was a simultaneous infection of the middle ear mucous membrane and the lymphatic system. *Campbell.*

Recent Theories on Sound Conduction.

TREITEL, Berlin. (*Archives of Otolology*, Vol. XXXII, No. 5.) After reviewing recent literature, the author finds that more extended research is needed to settle the question. He thinks that it does not detract from Helmholtz's credit if his theory has been amplified or modified. All agree that for high tones, conduction through the ossicles is of little importance. Conduction through the ossicles is of little importance. Conduction through Mt. and the chain of ossicles is still accepted for low tones. As to the middle ear Beckman sees only a dampening apparatus, for movements of the very unstable labyrinthine fluid.

Rinne's experiment is of undoubted value in the diagnosis of ear disease. There is still a doubt as to how sound waves excite the fibres of the basilar membrane; bone conduction is sufficient in itself to produce this, as is seen in cases of loss of Mt. and in fixation of the stapes with lengthened bone conduction. *Campbell.*

Ankylosis of the Stapes.

DENKER. (*Klinisch-Therapeut. Wchnsch.*, Vol. 10, No. 30.) In all cases of bony stapes fixation, there existed a transformation of the normal bony tissue of the stapes, and of the neighboring bone of the niche of the oval window, in which osteoid tissue, and later spongy tissue were formed as a result of which the annular ligament in some cases, have entirely dis-

appeared, in the newly formed bony masses, whereas in other cases the stapes was united with the margin of the window by bony strands.

With regard to the etiology of the affection, the writer believes that it is not only theoretically possible for a middle ear affection to lead to an ossifying periostitis, and produce such changes in the bone, but it is even extremely probable, in view of the frequent association of the two affections, that a casual relationship exists, at least for many cases.

This assumption does not, however, explain the method of origin of the spongy tissue in all the cases, which show no alteration in the mucuous membrane of the tympanum, which could be considered as a result of previous inflammatory processes.

In such cases, we must assume a primary involvement of the periosteum, or of the bone. It is established that the spongy alteration may take place without involvement of the periosteum, but as a rule the periosteum of the tympanum or of the vestibule is involved.

The question of the etiology of the capsule of the labyrinth is partially answered by statistic which show that the bony ankylosis of the stapes occurs, especially in women, who attribute in most instances, their affection to pregnancy or childbirth. In many other instances, however, constitutional anomalies must be considered, especially in view of the fact that the affection begins usually on both sides, and with the same degree of intensity.

The diagnosis the stapes ankylosis, is not difficult. If the tube is open, and the drum membrane normal, we may assume that stapes fixation is present, when the functional test shows marked diminution of hearing, and negative result with Rinne's test. Cases in which the diagnosis of stapes ankylosis was made on these grounds, have, without exception, at autopsy, shown the correctness of the diagnosis.

With regard to treatment, the writer believes that all local procedures, ranging from simple Politzer inflation to an extraction of the stapes, have given unsatisfactory results, that they are not to be recommended, especially since in many cases, an actual injury may possibly result. Although it is not possible to improve the hearing by therapeutic measures,

in many instances, however, the subjective sounds may be favorably influenced by massage of the drum membrane.

Goodale.

Case of Spontaneous Dislocation of the Incus, with Fistulous Rupture into the Bony Meatus.

IMHOFER. (*Prager Med. Wochen.*, Sept. 3, 1903.) A child two and a half years old was brought, showing marked emaciation, following gastro-enteritis, pertussis, general furunculosis, and multiple glandular enlargement. The right meatus showed abundant pus, while the drum membrane appeared reddened, swelled and covered posteriorly with granulations. Treatment was carried out for three months with improvement, when fever suddenly set in, and inspection showed the region behind the left ear markedly swollen and reddened, the mastoid process sensitive, while the posterior, upper wall of the meatus was pushed forward. Operation was on the point of being performed, when the mother of the child refused to give her consent. Two days later, the severe symptoms improved, the temperature fell to normal, and the swelling subsided. Two months later, the mother noticed a body in the ear which prevented syringing and cleansing. Examination showed a mass extending into the lumen of the external meatus, and closing it almost completely. The pea-sized mass was removed, and proved to be the incus, imbedded in granulations. Examinations subsequently showed a fistula at the spot where the mass was imbedded, which extended in the direction of the mastoid antrum. Subsequently a sequestrum of bone was thrown off, which came apparently from the vicinity of the antrum. The child continued to improve, and is now in excellent condition.

Goodale.

II.—NOSE AND NASO-PHARYNX.

The Etiology of Nasal Polypi.

FRANCIS R. PACKARD. (*American Journal of the Med-*

ical Sciences, November, 1903.) Packard thinks that in most cases polypi have their origin in diseased tissue, especially in some part of a necrosed ethmoid; that they are not mere tumors, the removal of which will cure the condition, but that they are results of pathological conditions, and that they should be carefully studied with reference to the underlying conditions which are causative and the correction of these attended to.

Richards.

The Diagnosis and Treatment of Inflammation of the Accessory Nasal Sinuses.

JOSEPH S. GIBB, Philadelphia. (*American Medicine*, July 25, 1903.) Exploration of the maxillary antrum with trocar and canula and the syringing out of the cavity with pus is recommended as a diagnostic measure, with which procedure the reviewer is in entire accord, having found it to be almost painless for the patient, done with comparative ease, and to give immediate positive information where one might otherwise be a long time in doubt as to the diagnosis. Treatment is entirely surgical, the author regarding it as a waste of time to attempt to wash out this sinus through the natural opening. He considers perforation of the canine fossa the preferable route to reach the sinus, as a larger opening can thereby be secured, and no sound teeth are removed. A sufficiently large opening should be made so as to allow for the free use of curettes and other instruments. A good sized opening being made in the canine fossa, the after treatment consists in packing the sinus with antiseptic gauze or introducing a good sized drainage tube. Irrigation is continued until all evidences of suppuration disappear. Considerable time is sometimes required before this is brought about.

In cases of frontal sinus suppuration he rather leans toward the open method when external operation is performed, inasmuch as the latter allows the sinus to be kept open for an indefinite time, with later possible cicatrization and obliteration of the sinus. The incision is made along the superciliary ridge down to the bone; a button of bone removed over the sinus and the latter thoroughly cureted. Reference

is also made to inflammation of the ethmoid and sphenoid cavities.

Richards.

Nasal Polypi: A Study of One Hundred and Forty-seven Cases.

J. PAYSON CLARK, Boston. (*Boston Medical and Surgical Journal*, July 2, 1903.) Histologically nasal polypi must be considered as stretched and edematous mucous membrane, not as true myxomatous tissue. The author found no evidence that constitutional diathesis or impairment of general health stood in any causative relation to the development of polypi, nor does he think that the septal deformity or nasal obstructions have much of any relation except that a deformed septum might bring about a condition favorable to the growth of polyps. A neglected injury to the nose, with its attendant nasal obstruction, impairment of the circulation by pressure, and irritating muco-purulent or purulent discharge from the injured portion, might quite conceivably result in the formation of edematous granulations which would eventually develop into full-fledged polyps.

With reference to ethmoid disease, he does not think that all cases are due to that as a cause. Four-fifths of his cases gave a history of frequent head-colds, but he thinks that in many cases these colds are only symptoms of existing polypi. Sneezing was marked in one-third of the cases. Thirty-nine out of ninety-three had lost the sense of smell; four were much impaired; twenty-seven impaired; leaving twenty-seven, or somewhat less than one-fourth in whom the sense of smell was presumably normal. Bronchitis was noted in 21 cases and asthma in 10; asthma and bronchitis in 14; hay fever in 4. No case in which the nasal polyp took on a malignant character was observed. In removal the galvano-cautery was not used, and he is opposed to its use, as it may tend to excite the condition in the mucous membrane which we are trying to get rid of. The middle turbinate will frequently have to be removed, as it is sometimes so deeply affected by the process that only its thorough removal will suffice to eradicate the disease. In some cases the application of 95 per cent. alcohol on pledgets of cotton to the site of the growths seemed to be of some assistance in preventing

the recurrence of polypi. Only a small portion of cases are caused by sinus disease. A cure will usually result if patients will return sufficiently often for treatment. *Richards.*

Cheesy Empyema of the Nasal Accessory Sinuses.

STIEDA, Königsberg. (*Archives of Otolology*, Vol. XXXII, No. 5.) The author reports three cases in which the pronounced feature common to all was the extensive formation of fetid cheesy material in the nose. This was easily removed with a dull curette. In all three cases the fistula formed a communication with the surface in the orbital region. In the one case was found in almost pure culture the bacillus coli communis, in two an amorphous material, while the material removed from the third contained connective-tissue cells, many of them broken down, looking like cut sections of the acini of glands.

The cases were readily cured by the establishment of free drainage and keeping the cavities cleansed. *Campbell.*

On the Influence of the Enlargement of Portions of the Pharyngeal Lymphatic Ring in General, and Adenoid Vegetation of the Naso-pharynx in Particular, upon the General Well-being of the Organism.

W. N. NIKITIN. (*St. Petersburger Med. Wochen.*, July 5th, 1903.) The author considers a normal tonsil, whether a lingual, pharyngeal or faucial, to be one which is not elevated above the surrounding surface. He therefore agrees with Bosworth in considering the tonsils of the anatomist as pathologica structures. In the majority of persons, with enlarged tonsils one finds also enlargement of other portions of the lymphatic ring. In all such swellings, one can distinguish two types, namely, those with a small amount of connective tissue, and others which are firmer, and show connective tissue strands. As time goes on, the latter begin to predominate, and the follicles, as a result of cheesy or calcareous degeneration, or by cicatricial changes, disappear, and the connective tissue bundles become cirrhotic. The author does not regard these manifestations as evidence of natural healing.

any more than in the case of sclerosis occurring in an enlarged liver. The symptoms of mechanical disturbance become less and less with time, but secondary alterations persist, and excite later new and peculiar disturbances.

After reviewing the symptoms due to enlargement of these structures, the author proceeds to discuss the question of infection in the different regions.

It is interesting to note that late forms of syphilis and hereditary syphilis excite a hypertrophy of the lingual tonsil rather than an atrophy. The bacilli of tuberculosis make their entrance into the system, particularly through the pharyngeal and faucial tonsils. In tuberculosis of the pharyngeal tonsil in children, there is always the possibility of an extension, directly through the lymph channels, into the base of the brain, producing basilar meningitis.

The author believes in the complete removal of the pharyngeal and faucial tonsils, but does not employ an anesthetic for the purpose

Goodale.

On the Relation of Oral Diseases to those of the Nose and Naso-Pharynx.

KOSTLJANETZ. (*St. Petersburg Med. Wochen.*, April 5, 1903.) In 1,600 patients examined with alterations in the nose or naso pharynx, 107 showed otitis (acute 34, chronic 53, healed 20), 167 showed Eustachian catarrh (acute 41, chronic 120), 46 showed sclerosis, 4 showed deafness as a result of intoxication, 11 showed affections of the labyrinth, 3.29 per cent. in all. The alterations in the nose or naso-pharynx were either directly or indirectly produced by continued early inflammatory affections. The author regards this percentage as perhaps actually too small, and believes that the number of ear diseases owing their origin to the nose or naso-pharynx is in reality larger.

Goodale.

On the Relation Between So-Called Adenoid Vegetations and Enuresis Nocturna.

ZWILLINGER. (*Medizinisch-Chirurgische Presse.*, Oct. 3, 1903.) The author found in 113 cases of adenoids, six

children who showed enuresis nocturna. Three of the cases were immediately cured after the operation. In all cases, therefore, of this affection the author recommends the examination of the child for adenoid vegetations. *Goodale.*

III.—MOUTH AND PHARYNX.

Tuberculosis of the Tonsils and the Tonsils as a Portal of Tubercular Infection.

HENRY KOPLINK, New York. (*American Journal of the Medical Sciences*, November, 1903.) As compared with the pyogenic forms of infection, the tonsil is the seat of primary tubercular infection but rarely. The tubercular tissue is found in the form of giant cells and tubercular nodules. It is exceptional that tubercle bacilli are abundant. Ulcers are rare. The lymph nodes leading from the tonsil are usually affected. Tonsillar tuberculosis may be the source of a general tuberculosis. So far as the cervical lymph nodes are concerned, if the seat of isolated tubercular infection of a primary nature, it can be justly claimed that such infection has proceeded from the tonsil. *Richards.*

A Case of Lipoma of the Tonsil.

CLEMENT F. THEISEN, Albany. (*Albany Medical Annals*, August, 1903.) Cases of lipoma of the tonsil are rare, the author being able to find but six recorded cases. All of these are since the year 1893. The case reported was in a girl of eight years who had had a troublesome cough more or less of the time since three years of age. The tumor was first discovered at that time and an operation advised, but for some reason was not done and the child was not seen again for five years. The tumor, which had grown somewhat larger, was attached to the center of the right tonsil by a rather long, thin pedicle coming from a tonsillar crypt almost in the center of the tonsil. It was removed by cutting it off as close to the tonsil as possible. Histologically the specimen consists of a

small, distinctly pedunculated tumor, globular in shape, measuring 7 mm. in diameter. The pedicle was 3 mm. in length. The outer surface of the tumor was covered by a thin, gray membrane, resembling skin in appearance. The greater portion of the tumor consisted of typical areolar tissue, containing vessels quite uniform in size and normal in character.

Richards.

The Causation and Treatment of Postnasal Discharge.

PERRY G. GOLDSMITH, Bellville, Ontario. (*American Medicine*, October 3, 1903.) The author has found chronic inflammation of the pharyngeal mucous membrane to be frequently accompanied by gastro-intestinal trouble and sometimes by rheumatism.

The vault is thoroughly cleansed with an alkaline post-nasal douche and then pigments of silver nitrate, iodine and carbolic acid, argyrol and protargol are used, as circumstances may seem to indicate. Scraping the naso-pharynx with a dull curet will occasionally give good results. Cases with dry, glazed condition of mucous membrane are especially obstinate and are usually associated with a similar condition of the nasal mucous membrane. Amelioration of the symptoms is the best that can be promised. There are certain cases of naso-pharyngitis of the neurotic type where almost nothing is found on examination but where much is complained of. These cases occur mostly in women whose nervous stability is below par. Measures directed to improving the general condition are indicated and little or nothing should be done by way of local applications. Imaginary operative measures sometimes produce great benefit, especially when accompanied by positive assurances that there is nothing seriously wrong.

Richards.

Hemorrhage Following Tonsillotomy, with Report of a Serious Case.

ADOLPH H. URBAN, Buffalo, N. Y. (*American Medicine*, July 4, 1903.) Patient was a boy of 7 who had been operated on at 2 p. m. of the day previous for hypertrophy of

each tonsil. No serious hemorrhage occurred immediately after, nor had any occurred as late as six hours after when he was seen by the physician who performed the operation. Sometime during the following morning hemorrhage commenced, and when seen at 5 p. m., of the day following the operation, consciousness was still present but he was unable to articulate. There was considerable vomiting of dark colored blood but no expectoration or bleeding from the mouth. A parenchymatous spurting hemorrhage was seen in the left tonsillar region, the blood being swallowed. Chloroform was given and a Paquelin cautery, heated to a dull cherry red color, applied directly to the bleeding surface. Hemorrhage ceased immediately, 700 cc. of normal salt solution was injected into the left median basilic vein. Recovery was uneventful. This case is interesting in that it occurred in a child, where serious hemorrhage after tonsillotomy is not usually expected, and that it occurred 12 to 18 hours after the operation. It was probably due to either an anomalous tonsillar or internal maxillary artery. *Richards.*

The Complications of Hypertrophy of the Pharyngeal Tonsil.

GEORGE B. WOOD, Philadelphia. (*American Medicine*, October 3, 1903.) While admitting that the tonsils have certain good physiologic properties, the amount of harm which hypertrophy of them is likely to bring about is much greater than any possible good, since hypertrophy gives greater chances for absorption of poison, while the increased manufacture of lymphoid cells will in some cases bring about some pathologic condition of the blood. More serious complications due to hypertrophy of the pharyngeal tonsil are otitic disturbances. The child with adenoids is more often taken to the physician on account of symptoms referable to the ear than for any other reason, and the large majority of cases of ear diseases in children are directly due to hypertrophy of the pharyngeal tonsil. The condition of this organ should always be investigated in cases of ear disease in children. In all cases of hypertrophy the pharyngeal tonsil is likely to become a constant source of infection to the whole of the respiratory tract. *Richards.*

The Lymphatic System and the Tonsils.

HENRY L. SWAIN, New Haven, Conn. (*The American Journal of the Medical Sciences*, July, 1903.)

Acute General Infections Originating in the Lymphoid Tissue of the Upper Respiratory Tract.

HENRY L. SWAIN, New Haven, Conn. ((*The Philadelphia Medical Journal*, December 13, 1902.) The author reports a case where tonsillar enlargement was dependent upon general lymphadenitis. The faucial tonsils enlarged enormously from time to time as did the lingual and pharyngeal tonsils, the attacks occurring usually in connection with the general lymphadenitis. The patient was 63 years old when first seen and had been subject all his life to such changes. He was under observation two years. The most benefit was obtained from Fowler's solution. He finally died from exhaustion. The tonsils enlarged so that they met in the middle line. No operation was performed on them, the treatment being mostly the use of Fowler's solution, the most benefit being obtained from this. The blood count sometimes showed an increase in the white cells; at others it was nearly normal. The author regards the tonsils, both pharyngeal and faucial, as a part of the general lymphatic system and to be treated accordingly, and does not think one's whole duty to a patient suffering from these conditions is done when the operation of ablation of a portion of the faucial tonsil or even the whole of it has been performed. Further studies ought to be given to the subject of the relation of the tonsils to the general body economy.

The pharyngeal tonsil is liable to acute attacks of inflammation in much the same way as is the faucial tonsil and much oftener than is generally considered. The typical symptoms of acute inflammation of the faucial tonsil are given, and several cases illustrating the same, cited. In these cases blood examinations show but little. In many cases when the diagnosis of inflammation of the pharyngeal tonsil is in doubt, shrinking of the tissues of the nose with cocain and suprarenal will give positive information. In

many children post-nasal examination with the mirror is not impossible if sufficient care is taken. While digital examination is, of course, always possible, the information which it gives is limited somewhat to the question or not of enlargement, while the character of the inflammation and the condition of the surface cannot be determined with anywhere near the accuracy which is possible by examination with the mirror or indirectly through the nose.

Richards.

IV.—LARYNX.

Hypertrophic Tuberculosis of the Larynx.

CLEMENT F. THEISEN, Albany. (*American Journal of the Medical Sciences*, November, 1903.) This is a form of tuberculosis in which hypertrophy of all the structures of the larynx but no ulceration takes place. The case reported was a man of 40 years, weight 175 pounds, nearly complete aphonia, losing flesh, lungs negative. Tubercle bacilli had been found in the sputum in a former examination, but were not evident when first seen by the writer. The mucosa of the larynx was reddened, with well-marked thickening in the interarytenoid space, which was firm to the touch. Both arytenoids were thickened and infiltrated, and both cords. There were circumscribed areas on both ventricular bands, with broad bases, presenting the appearance of hyperplasia of the tissues, and covered with perfectly intact, smooth mucous membrane of grayish red color. There was no ulceration anywhere, nor was the epiglottis involved. A diagnosis of laryngeal tuberculosis was made and patient sent away. He was seen by other physicians and a diagnosis of pachydermia laryngis was given. Subsequent history with death from general and well-marked laryngeal and pulmonary tuberculosis at Saranac Lake proved the diagnosis of tuberculosis of the larynx. The literature of the recorded cases is given at some length.

Richards.

The Early Manifestations of Laryngeal Tuberculosis; Their Frequency and Treatment.

H. H. BRIGGS. Asheville, N. C. (*Jour. Amer. Med. Assn.*, December 19, 1903.) Most subjects of pulmonary tuberculosis show in the larynx, prior to the characteristic tumefactions and infiltrations, either a uniform thickening of the mucosa or an irregular thickening and hyperplasia of reddish hue of the ventricular bands and arytenoid commissure; presenting dilated blood vessels and covered with thick grayish mucus, at the start not differing materially from the laryngitis of diathetic or climatic cause. The acute form of laryngeal tuberculosis usually begins after softening has taken place in the lung and when the laryngitis has reached its crisis. The first sign is hyperemia, following which are multiple erosions on the laryngeal surface of the epiglottis and arytenoids, soon to be followed by tumefaction in the epiglottis or aryepiglottic folds. The cough is hacking with a pricking, itching dryness of the throat, hoarseness, later aphonic, with occasionally dysphagia. The cough is distinctly laryngeal unless the repeated hackings induce a spasmodic and expulsive deep cough, but the effort is primarily to free the larynx from the tickling and dry sensation. The laryngeal appearances of the tubercular lesion are fairly characteristic. The color is a shining grayish or yellowish pink, and the location of the lesion is usually in the interarytenoid space, arytenoid bodies, ventricular bands, epiglottis and vocal cords. The interarytenoid space at first shows only a thickening, but later a roughened convexity anteriorly. The arytenoid bodies and ary-epiglottic folds become club-shaped, while the infiltrated ventricular bands often cover the cords, portions of which, especially the processus vocalis, become congested and nibbled by erosions. The turban appearance of the epiglottis follows after other parts are broken down. Diagnosis in the later stages is seldom difficult.

The author is opposed to the routine spraying and inhaling much in vogue, believing in mild treatment and the introduction of solutions which help keep the parts free of mucus. Repeated coughing or hawking should be interdicted as much as possible. The inflammatory condition should receive

such treatment as is indicated, mostly astringents as zinc chlorid, tannate of glycerin, creosote and iodine, pyoktannin and silver nitrate, introduced with the least possible irritation to the parts. The nose and throat should be kept in as good condition as possible. In the strictest sense of the word he does not believe any case is cured, but thinks that with close observation and control of every detail, many patients can live for a number of years. *Richards.*

V.—MISCELLANEOUS.

Development of the Faculty of Speech.

G. HUDSON MAKUEN, Philadelphia. (*International Medical Magazine*, July, 1903.) Ill health is responsible for many cases of faulty development in speech. Among the principle causes are the infectious diseases of childhood, which seem to have a special predilection for the nerve centers of speech and are responsible for many serious disturbances. A severe shock to the nervous system from any cause, a sudden fright or blow upon the head is often an exciting cause of speech defects, especially in children predisposed to such conditions by means of unstable mental and physical constitutions.

To have good speech, a child must be both, well-born and well-bred. He must inherit a tendency toward the development of good speech and must hear only good speech. He must be healthy mentally and physically and free from gaps or weak places in the nervous system. Deformities of structure have considerable influence in speech development; among these are cleft lip or palate, deformities of the alveolar arch and irregular teeth. Hypertrophied tonsils and the various forms of nasal obstruction affect the voice more than they do the development of speech. Many of the causes of disturbance are due to the changes in the central mechanism of speech rather than in the peripheral organs.

Crying is the child's initial form of expression. It appears immediately upon the advent of the child and continues on

a gradually diminishing scale for three years. The initial cry is the cry of an instinctive effort to expand the lungs, develop the vocal organs, and is probably seldom due to pain or discomfort. By the fifth week different kinds of crying sounds have been used, each to denote a special need or state of feeling, and the observant mother soon learns to understand this preliminary child language. Laughing, smiling, and other forms of facial expression begin in the second week; grunting appears in the third.

Most child sounds are at first instinctive and automatic, but soon become imitative. The earliest forms of expression are some of the elementary sounds as *ana*, *mama*. These are the result of unconscious imitation. By the fourteenth month the child begins to echo what it has heard without regard to meaning. This condition is known as *echolalia*.

A little later intelligent speech production begins, a very decided change takes place, and the child may have difficulty in making the transition. It happens occasionally that for a few days all speech is forgotten. This transition is sometimes a slow process and should have careful attention. The conscious mind is endeavoring to take control of the processes of speech, and what was formerly a mere echo of comparatively meaningless words and sentences is now becoming the voluntary oral expression of thoughts, arising in the intellectual centers of the brain. A confusion of thoughts at this time often brings about a lack of harmony in the action of the cerebral speech centers, resulting in the various forms of defects of speech.

Richards.

Notes from the Throat Department of the Pathological Laboratory of the Manhattan Eye and Ear Hospital.

JONATHAN WRIGHT, New York. (*American Journal of the Medical Sciences*, June, 1903.)

(a) A rapidly recurring bleeding polyp of the septum nasi, appearing twice in a woman, each time at the seventh month of pregnancy.

(b) Papillary adenomatous hypertrophy of the mucous membrane of the septum.

(c) A cyst in the lymphoid tissue of the pharynx.

(d) Effusion of serum into the nasal mucosa in coryza.

With remarks on the relation of these lesion to other morbid conditions of the nose and throat.

A pathological study to which the reader is referred, as it does not lend itself well to abstract. One point only may be here referred to, namely: Dr. Wright thinks there are plausible reasons for believing that "the essential lesion and the primary one in atrophic rhinitis is a bone lesion which interferes in some way with the radical vessel, which lie in bony canals, or are compressed in some way against bony plates."

Richards.

Esophagoscopy, and Its Diagnostic Value.

HUGO STARK. (*St. Petersburger Med. Wochen.*, June 28, 1903.) Esophagoscopy is practicable only in the hands of an expert, owing to the severe discomfort which it is likely to occasion the patient. It requires much experience to be able to interpret satisfactorily the pictures obtained. The majority of persons, however, can be examined, and the most suitable instrument is a straight, strong tube. Esophagoscopy is the most certain method for the recognition and localization of foreign bodies. An early diagnosis of carcinoma is only possible with the help of esophagoscope. Anatomical alterations such as ulcers, inflammations, scars, etc., are recognized most certainly by the method. The differential diagnosis between functional and anatomical stenosis is in many cases only possible by the help of the esophagoscope.

Goodale.

Stricture of the Esophagus Following Diphtheria.

JUNGNICKEL. (*Prager Med. Wochen.*, Sept. 17, 1903.) This is an unusual case of stricture of the esophagus. The patient, a man 18 years of age, was taken with diphtheria, and apparently recovered completely in the course of 8 days. Two weeks later difficulty in swallowing began to set in, which showed itself only for solid food. This condition lasted for several months, and was unattended by other symptoms. Four months later, examination showed an obstruction in the

esophagus, eighteen centimeters from the teeth extending for a distance of twelve centimeters. Esophagotomy was performed by Bergman, who found at point corresponding to the obstruction, a cicatricial band, extending obliquely, below and under which a bulging diverticulum was found, evidently due to the repeated passages of the bougie. Examination twelve centimeters lower down showed another stricture, which it was almost impossible to penetrate with the fine urethral sound. Systematic dilatation was performed, and the patient left the hospital eight months later, able to swallow, although still obliged to pass bougies several times a week. The author regards the ulceration and scar formation to be due to the attack of diphtheria. *Goodale.*

Anesthesin in Rhino-Laryngeal Practice.

COUTADE. (*Ally. Wien. Med. Zeit.*, Vol. 48, No. 12.) The author reports results of experiments with this preparation in clinical work. In the case of a young man, whose tonsils were to be cauterized, anesthesin was applied on one side, in the form of powder, with the result that no pain was experienced here, while on the opposite side, the burning caused much discomfort.

In tuberculosis of the larynx, attended with much pain, anesthesin was insufflated, with the result that swallowing was performed without pain for 48 hours, and even eight days later, there was a distinct diminution of sensibility.

Anesthesin is preferably applied in the form of a powder but may be used in painful laryngitis, in the following formula:

Anesthesin	-	-	-	-	20.0
Menthol	-	-	-	-	10-20.0
Ol. Oliv.	-	-	-	-	100.0

Goodale.

Non-Tubercular Hemorrhages of the Air-Passages.

LAFAYETTE PAGE, Indianapolis. (*Jour. Amer. Med. Assn.*, Dec. 13, 1903.) Three cases of severe non-tubercular hemorrhage are reported. In the first there was complete

necrosis of the posterior portion of the septum with ulceration of the veins of the pharyngeal vault. This was of syphilitic origin, the treatment of which condition soon stopped all bleeding. The second case had severe hemorrhage, supposed to come from the stomach, and for which laparotomy was performed and the stomach opened. As the hemorrhage still continued the author was called and found two deep fissures $1\frac{1}{2}$ inches long at the base of the tongue with deep excavation. These were of syphilitic origin and the cause of the hemorrhage, which ceased after anti-syphilitic general and local treatment.

The third case was one of hemorrhage due to angioma on the vocal cord. Here the hemorrhage had been supposed to be due to pulmonary trouble and the patient ordered to Colorado. The angioma was destroyed with the galvano-cautery.

Cocaine spray and suprarenal extract are valuable aids in making a diagnosis. *Richards.*

An Analysis of Fifteen Hundred Cases of Tuberculosis Discharged from the Adirondack Cottage Sanitarium from Two to Eighteen Years Ago.

LAWRASON BROWN, Saranac Lake. (*N. Y. Jour. Amer. Med. Assn.*, November 21, 1903.) The first five hundred of these cases were on admission not as favorable as the second thousand, since there were a much greater number of advanced cases. Of the entire number 497 (33 per cent.) are alive; 569 (38 per cent.) are dead; and 434 untraced. Of the 497 patients that are alive, 329 (22 per cent. of the whole) are well; 69 (4.6 per cent. of the whole) are arrested; 44 (3 per cent.) relapsed, and 55 (3.7 per cent.) are chronic.

Richards.

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